

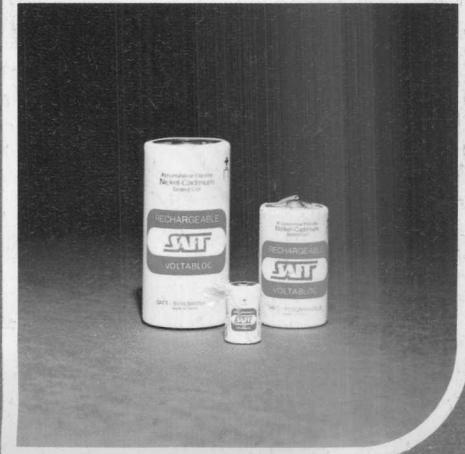
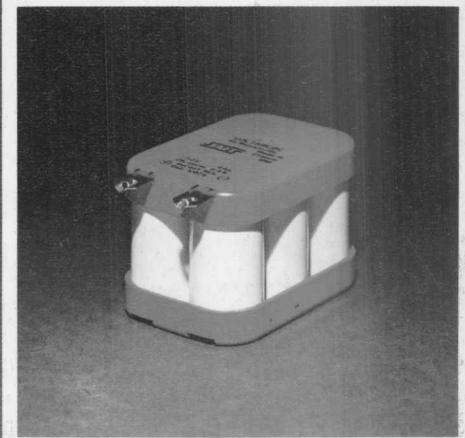
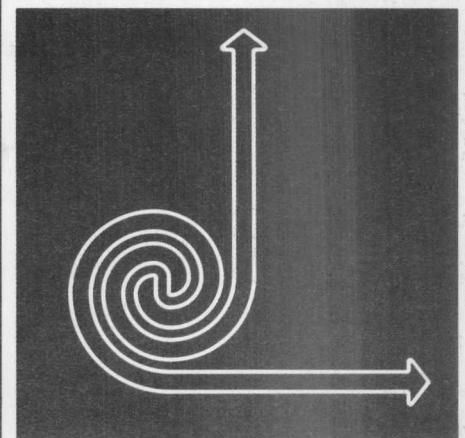


STORAGE BATTERY DIVISION

# SEALED RECHARGEABLE NICKEL-CADMIUM CELLS VR SERIES

Telecommunications,  
E.D.P. Electronics,  
All emergency energy applications.

TO MORROW'S ANSWER  
TO TODAY'S POWER NEEDS





*nickel-cadmium cells with thin sintered plates  
are the ideal energy or power source  
each time that the application requires,  
even in the most severe  
environmental conditions,  
high performances,  
maximum reliability,  
very long life,  
minimum weight and volume.*

## 1 Principal advantages

- Sealed construction.
- Absolute freedom from maintenance.
- Indefinite shelf life from any state of charge.
- Fast charge ability.
- Extremely long life and reliability.
- Substantially flat voltage characteristic even at very high discharge rates.
- Unaffected by high rates of overcharge.
- Absolutely safe against accidental abuse, such as polarity reversal, due to the self-resealing safety valve.
- Excellent performance from  $-40^{\circ}\text{C}$  to  $+50^{\circ}\text{C}$ .
- Shockproof and vibration-proof.

## 2 Applications

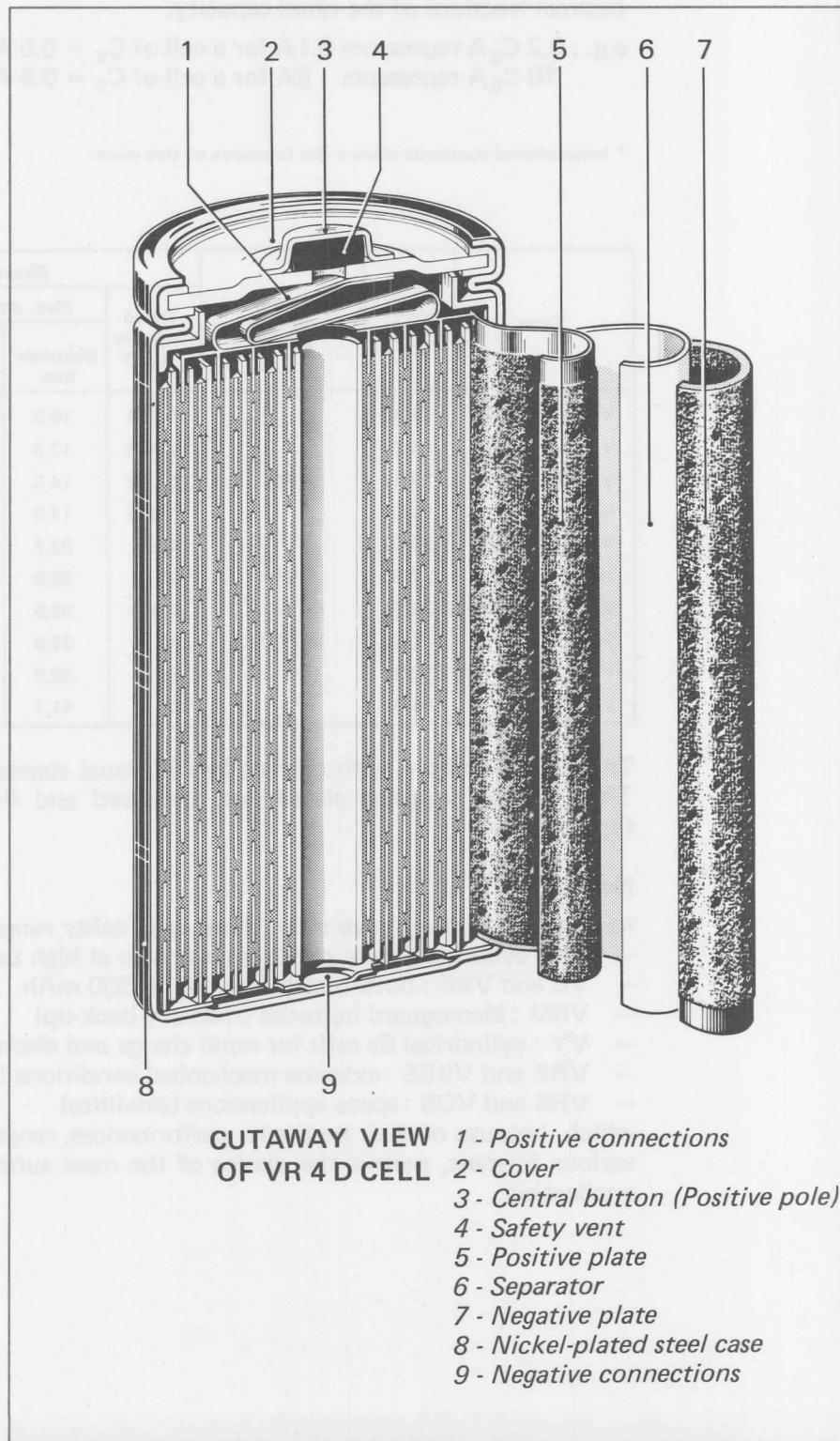
Due to their outstanding performance on charge and discharge, SAFT VR sealed nickel-cadmium cells are the most suitable energy source :

- for all portable devices needing independent power :
  - telecommunications,
  - test and control equipment,
  - cameras, photo flashes, flood lights,
  - pocket calculators,
  - portable lights,
  - power tools,
  - home appliances,
  - toys.
- for all emergency systems :
  - electronics,
  - memory and logic circuits,
  - emergency lighting,
  - industrial processes,
  - starting of small engines.

### 3 Description

SAFT VR type sealed nickel-cadmium cylindrical cells comprise :

- spiral wound thin sintered plates,
- porous separator,
- alkaline electrolyte,
- nickel plated steel container,
- cover fitted with self-resealing safety valve.



## 4 Characteristics

Nominal voltage : 1.20 volt per cell

Rated capacity

$C_5$  \* (at 20° C) : capacity recoverable, expressed in ampere-hours (Ah), at the 5 hour discharge rate (0.2  $C_5$  A), to an end-of-discharge voltage of 1.10 V/cell, after a normal charge of 14 hours at 0.1  $C_5$  A.

Currents or rates of charge and discharge are expressed as multiples or decimal fractions of the rated capacity.

e.g. : 0.2  $C_5$  A represents 0.1A for a cell of  $C_5$  = 0.5 Ah.

10  $C_5$  A represents 5A for a cell of  $C_5$  = 0.5 Ah.

\* International standards allow a -5% tolerance on this value.

Type	I.E.C. Ref. KR	Equivalent primary battery	Sleeved cells			
			Rated capacity $C_5$ Ah	Max. dimensions		Max. weight g
				Diameter mm	Height mm	
VR 0,1 1/3 AA	15/18		0,100	14,3	17,4	11
VR 0,45 2/3 AF	18/29		0,450	17,3	28,1	21
VR 0,5 AA	15/51	R6	0,500	14,3	50,2	24
VR 0,8 AF	18/50		0,800	17,3	49,2	37
VR 1,2 RR Cs	23/43		1,2	22,7	42,1	51
VR 2 C	27/50	R14	2	25,9	49,7	77
VR 2,5 2/3 D	35/44		2,5	32,9	43,5	105
VR 4 D	35/62	R20	4	32,9	60,5	150
VR 7 F	35/92		7	32,9	91,3	240
VR 10 SF	44/91		10	41,7	89,2	400

These cells comply with current international standards IEC-UTE-MS. They can be supplied sleeved or unsleeved and fitted with various types of tag.

### Note :

In addition to the above cells, there exist other ranges of sealed cells :

- VT : cylindrical cells, continuous charge at high temperature
- VB and VBE : button cells from 40 to 600 mAh
- VBM : Memoguard batteries (memory back-up)
- VY : cylindrical Cs cells for rapid charge and discharge
- VRE and VBES : extreme mechanical conditions (missiles)
- VRS and VOS : space applications (satellites)

which, because of their particular performances, range of capacities and various formats, permit the choice of the most suitable type for each application.

## 5 Battery Pack Assemblies

### PRINCIPLE

Battery packs are made by connecting identical cells in series. The nominal voltage of each cell is 1.2 V. In a battery pack of N cells of rated capacity  $C_5$  Ah connected in series :

The nominal voltage of the pack is :  $N \times 1.2$  V.  
The rated capacity of the pack is :  $C_5$  Ah.

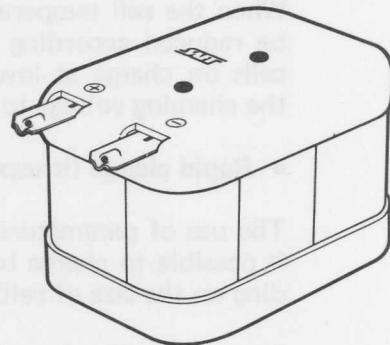
NOTE : It is possible to construct VR battery packs with a capacity greater than 10 Ah. Please consult SAFT.

Cells and packs may be connected by soft-soldering and are provided with nickel plated tags for this purpose. Direct soldering on the container or on the cover could be detrimental to the cell.

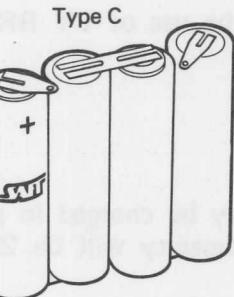
### STANDARD BATTERY PACKS

For the convenience of the user SAFT has designed standard battery pack assemblies.

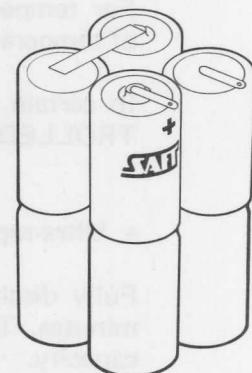
STANDARD BATTERIES



OTHER BATTERY PACKS



Type BC



Should none of these packs meet your requirements, our engineers will help you to design a suitable assembly.

## 6 Charging

VR cells are normally charged at a substantially constant current. Various charging methods can be considered in conjunction with the requirements of the application.

### CYCLING

- **Normal charge** (irrespective of initial state of charge) : 0.1  $C_5$  A for 14 hours within the temperature limits specified for each cell.

Chargers of types ST.A and ST.B are suitable for normal charging of most 6 volt and 12 volt batteries. Other chargers are available on request.

- **Accelerated charge** (irrespective of initial state of charge) according to type of cell (except VR 10) from 0.2  $C_5$  A for 7 hours to 0.4  $C_5$  A for 3.5 hours.

The rates of charge stated above may occasionally be taken beyond the specified times (overcharge) without risk of damaging the cell. The power dissipated per cell (in W) is  $1.4 \times$  charge current (in A). Cooling of the batteries or thermal charge cut-off are thus sometimes necessary.

When the cell temperature is less than + 5° C, the charge currents must be reduced according to the data shown for each cell. Protection for cells on charge at low temperatures may also be provided by limiting the charging voltage to 1.55 volt per cell.

- **Rapid charge** (irrespective of initial state of charge)

The use of parameters such as voltage, time and/or temperature makes it possible to charge batteries of VR cells in 15 to 60 minutes (depending on the size of cell).

Between + 10° C and + 40° C, on a SAFT-approved charging system, a standard battery of less than 50 Wh may be recharged in 1 hour, whatever its initial state of charge.

For temperatures below + 10° C, rapid charge requires measurement of temperature, which can only be done with a special battery.

In certain applications, the use of VY RR cells permits an UNCONTROLLED rapid charge.

- **Ultra-rapid charge**

Fully discharged cells may be charged in periods as short as 1 to 15 minutes. The available capacity will be 25 % to 80 % of the rated capacity.

Example : (temperature + 15° C to + 30° C)

VR 0.5 AA - charge for 3 minutes at 5 amp.  
Available capacity - 250 mAh.

## CONTINUOUS CHARGE (EMERGENCY POWER SYSTEMS)

To maintain cells in the fully charged condition at all times, and over a long period of time, it is necessary to make up losses and occasional discharges with a continuous low rate charge.

The recommended current depends on :

- the frequency of discharge,
- the capacity discharged,
- the recovery time allowed,
- the temperature.

Rates vary from  $0.005 C_5 A$  to  $0.05 C_5 A$ .

When the appropriate rate is below  $0.02 C_5 A$ , the battery should be given a normal charge ( $0.1 C_5 A$  for 14 hours) when commissioning.

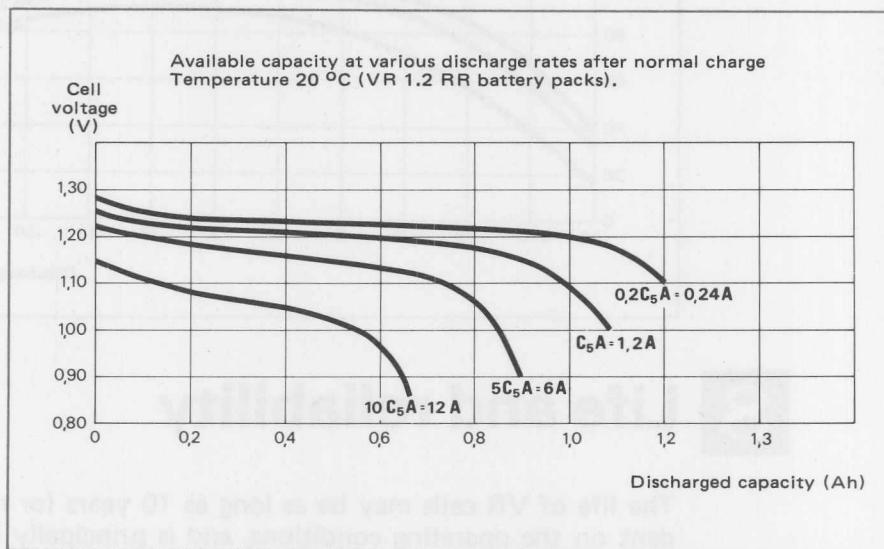
## 7

# Discharge

Due to the SAFT improved internal connection system, VR cells and batteries can deliver very high currents.

- **Continuous discharge**

The maximum continuous discharge rate varies from  $5 C_5 A$  to  $10 C_5 A$  according to the size of cell.

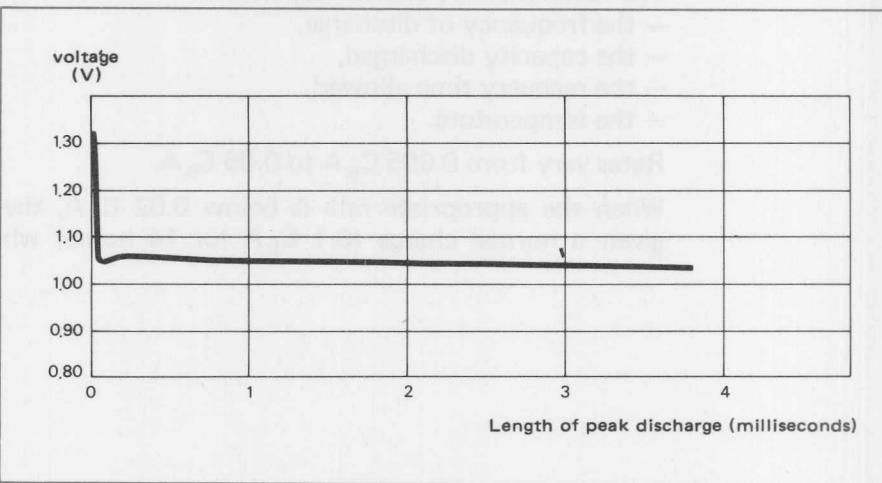


- **Short duration discharge**

Short duration peak discharges may be as high as  $20 C_5 A$  to  $140 C_5 A$  at 0.8 V per cell (please see data sheets).

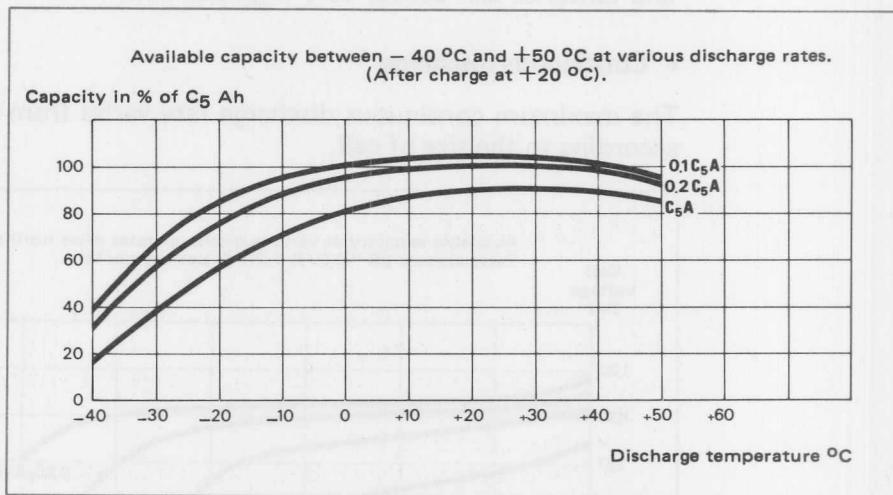
VR cells can operate as very compact low voltage capacitors giving a much greater energy in a much smaller space (see the first curve on following page).

Example : VR 1.2 cell  
Discharge 50 A



#### • Effects of temperature

SAFT VR cells give excellent discharge performance over a wide range of temperature ( $-40^{\circ}\text{C}$  to  $+50^{\circ}\text{C}$ ).



## 8 Life and reliability

The life of VR cells may be as long as 10 years (or more); it is dependent on the operating conditions, and is principally influenced by the depth of discharge  $\frac{\text{discharged capacity}}{\text{rated capacity}}$  in a cycling application, and by the total Ah of overcharge in a continuous charge application.

### CYCLING LIFE

- Approximately 500 cycles with 100 % depth of discharge.
- Approximately 2000 cycles with 50 % depth of discharge.

## LIFE ON CONTINUOUS CHARGE

The great reliability of VR cells makes them comparable with most electronic components.

e.g. : With a continuous charge rate of  $0.05 \text{ C}_5 \text{ A}$ , over a period of 5 years, failures do not exceed 0.5 %.

## 9 Maintenance

VR sealed cells and batteries require NIL maintenance.

## 10 Charge retention

VR cells have good charge retention, which is improved at low temperatures. After one month at  $+20^\circ \text{ C}$ , a charged cell will deliver about 70% of its capacity.

## 11 Shelf life

Performances of VR nickel-cadmium cells are not permanently affected by long storage, irrespective of their initial state of charge or of the temperature ( $-40^\circ \text{ C}$  to  $+50^\circ \text{ C}$ ). However, the most favourable conditions are :

- temperature : 5 to  $25^\circ \text{ C}$
- relative humidity below 80% (no condensation)
- cells in free air and on open circuit.

## 12 Transport

The mechanical strength of VR cells and VR standard flange batteries is excellent. This permits transport in very severe conditions. For example : bumps of 40g for 6ms at a rate of 2 to 3 per second.

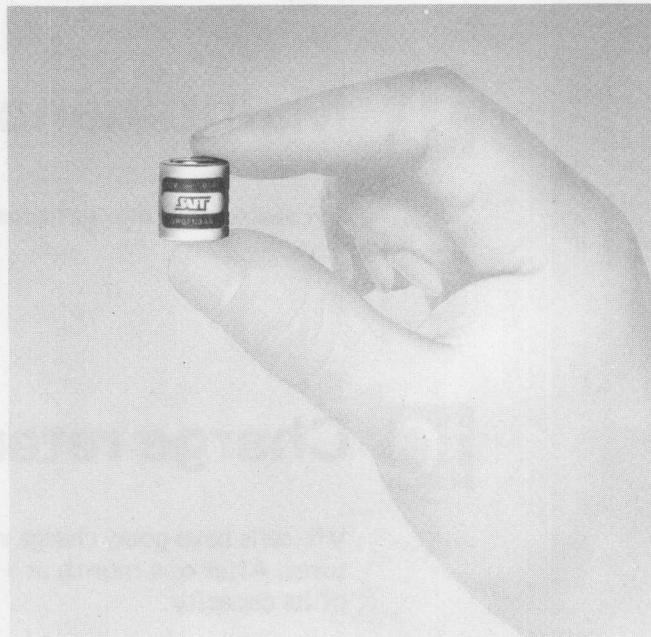
**Note :** After transport by air, cells and batteries which suffer condensation due to thermal changes must be dried before prolonged storage. Natural drying in free air is generally sufficient.

# CELL TYPE VR 0.1

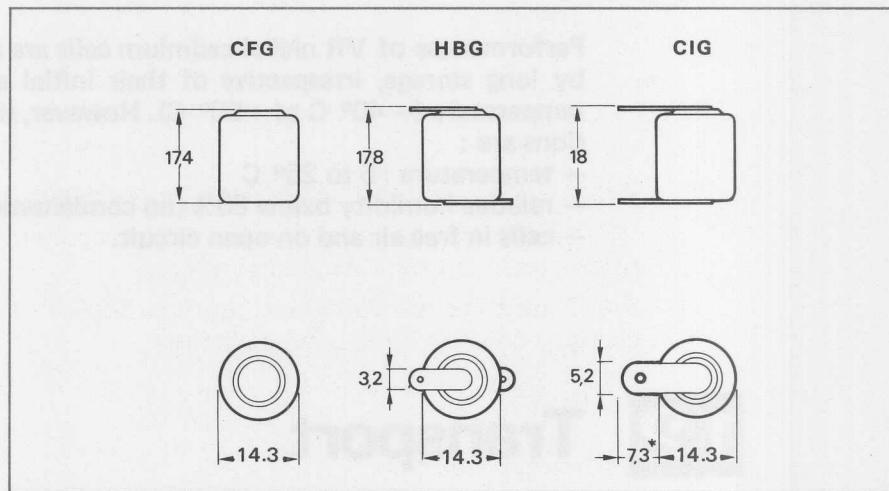
## 1/3 AA

(CEI : KR 15 / 18)

rated capacity  $C_5$  : 0.1 Ah.  
nominal voltage : 1.2 V.



## 1 mechanical characteristics



Max. dimensions in mm of sleeved cells (\*minimum).  
Cells without sleeves, reduce diameter by 0.3 mm. Max. weight : 11 g.

Standard nickel plated steel cell tags are suitable for continuous discharge rates up to 1 A.

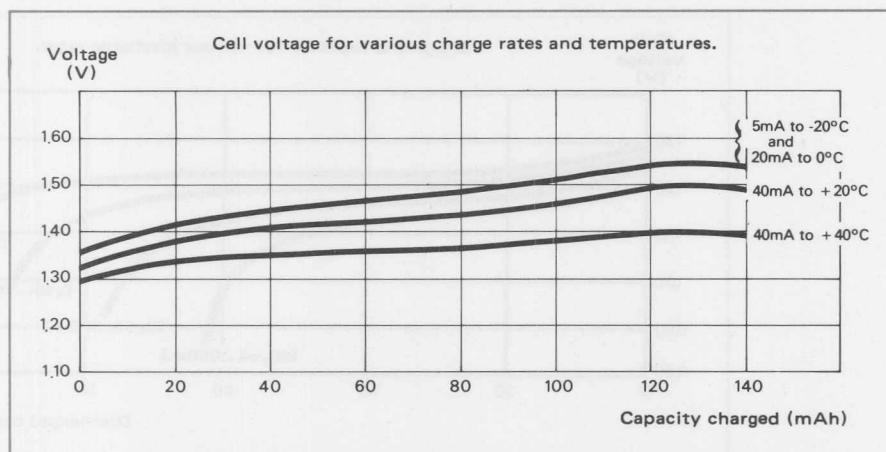
## 2 electrical performance

### 1. CHARGE

#### A — Normal charge (irrespective of the state of charge)

- from + 5 °C to + 50 °C :
  - normal charge : 10 mA for 14 hours
  - accelerated charge : up to 40 mA for 3.5 hours.
- from - 30 °C to + 5 °C.

Temperature ° C	Maximum charging rates		Charging time hr
	mA	hr	
-30	3	34	
-20	5	21	
-10	10	11	
0	20	6	
+ 5	40	3.5	



#### B — Rapid charge (irrespective of the state of charge)

VR 0.1 1/3 AA cells may be charged in 15 to 60 minutes by monitoring certain parameters (voltage, time, temperature).

### 2. OVERCHARGE

#### A — Cycling applications

An occasional, overcharge, even repeated, at the rates given in 1-A, beyond the prescribed times is not detrimental to VR 0.1 1/3 AA cells.

**B – Continuous charge**

Continuous rates depend on the required capacity, the recovery time allowed and the temperature.

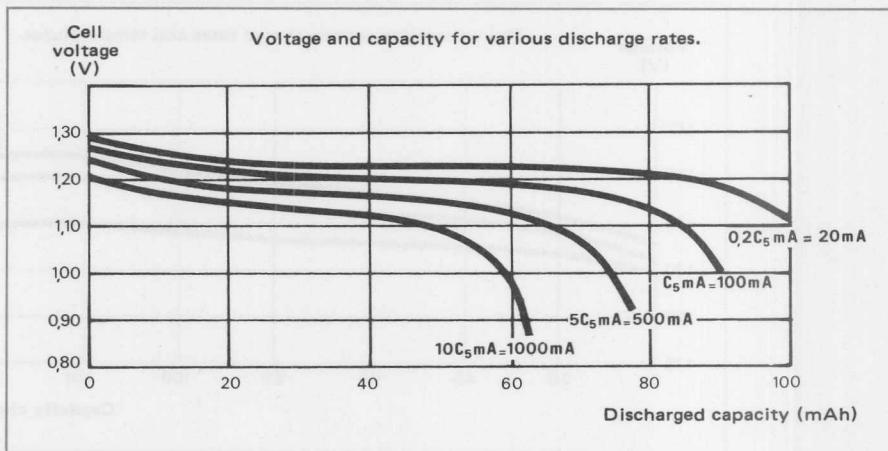
Recommended rates for a 24 hour recovery time between 0 °C and 30 °C.

Required capacity after 24 hours mAh	Appropriate rates mA
from 80 to 100	6
60 to 80	5
40 to 60	4
20 to 40	3
5 to 20	2
up to 5	1

**3. DISCHARGE**

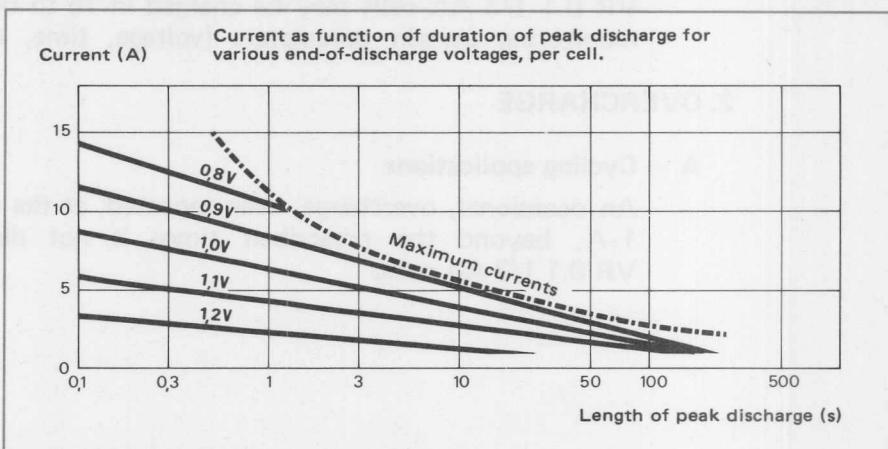
Continuous discharge at 20 ± 5 °C.

Maximum permissible continuous rate : 1 A.



Pulse discharge at 20 ± 5 °C.

Maximum power for a 0.3 s pulse : 10 W (U = 0.65 V - I = 15,4 A).



## 3 battery packs

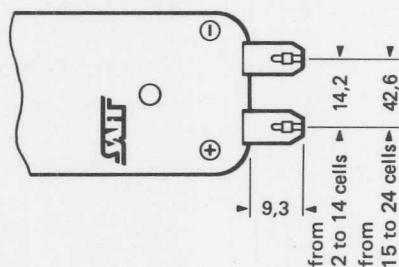
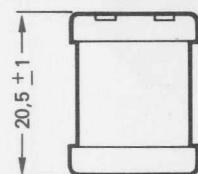
### STANDARD BATTERY PACK ASSEMBLIES VR 0.1 1/3 AA

Rated capacity : 0.1 Ah  
 Nominal voltage : 2.4 to 28.8 volts.

#### DESCRIPTION

- Sleeved cells cemented side by side.
- Welded low resistance heavy duty connections.
- Top and bottom a.b.s. flanges, with fixing holes 4.5 mm dia.
- Outgoing solder tags (1 mm<sup>2</sup> wire).

#### OVERALL DIMENSIONS (in mm)



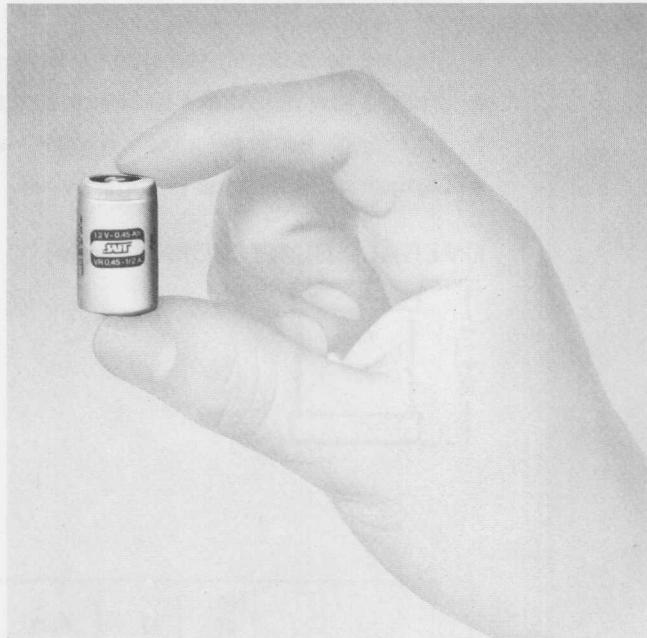
	No. of cells	U	Part	L ± 1	K ± 1	A ± 0,25	B ± 0,25	* W (g)
	2	2.4	120 657	31	16,8			17
	3	3.6	120 658	31	31			26
	4	4.8	120 659	31	31			35
	5	6	120 660	45.2	31	14.2		44
	6	7.2	120 661	45.2	31	14.2		52
	7	8.4	120 662	59.4	31	28.4		61
	8	9.6	120 663	59.4	31	28.4		70
	9	10.8	120 664	73.6	31	42.6		79
	10	12	120 665	73.6	31	42.6		88
	11	13.2	120 666	87.8	31	56.8		96
	12	14.4	120 667	87.8	31	56.8		105
	13	15.6	120 668	102	31	71		114
	14	16.8	120 669	102	31	71		123
	15	18	120 670	59.4	59.4	28.4	28.4	132
	16	19.2	120 671	59.4	59.4	28.4	28.4	140
	18	21.6	120 673	73.6	59.4	42.6	28.4	158
	20	24	120 675	73.6	59.4	42.6	28.4	176
	24	28.8	121 681	87.8	59.4	56.8	28.4	211

\* W (g) : max. weight in grams.

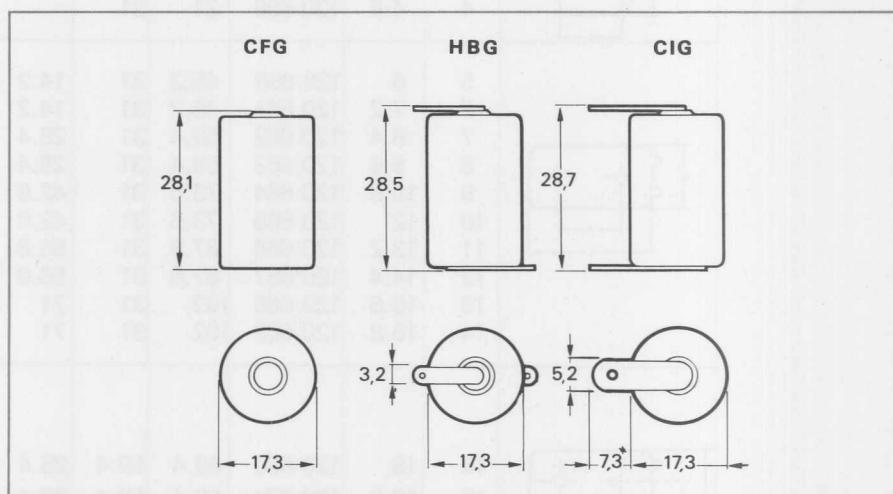
# CELL TYPE VR 0.45 2/3 AF

(CEI:KR 18/29)

rated capacity  $C_5$  : 0.45 Ah.  
nominal voltage : 1.2 V.



## 1 mechanical characteristics



Max. dimensions in mm of sleeved cells (\* minimum).  
Cells without sleeves, reduce diameter by 0.3 mm. Max. weight : 21 g.

Standard nickel plated steel cell tags are suitable for continuous discharge rates up to 4.5 A.

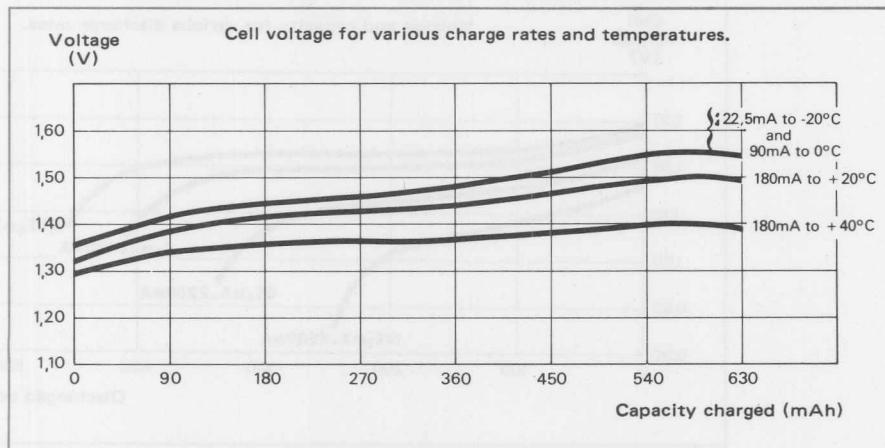
## 2 electrical performance

### 1. CHARGE

#### A – Normal charge (irrespective of the state of charge)

- from + 5 °C to + 50 °C :
  - normal charge : 45 mA for 14 hours
  - accelerated charge : up to 180 mA for 3.5 hours.
- from – 30 °C to + 5 °C.

Temperature °C	Maximum charging rates mA	Charging time hr
-30	13,5	34
-20	22,5	21
-10	45	11
0	90	6
+ 5	180	3,5



#### B – Rapid charge (irrespective of the state of charge)

VR 0.45 2/3 AF cells may be charged in 15 to 60 minutes by monitoring certain parameters (voltage, time, temperature).

#### C – Ultra-rapid charge (previously discharged cells only)

Suitable systems can provide recharge in 3 to 15 minutes depending on the proportion of capacity it is desired to obtain.

### 2. OVERCHARGE

#### A – Cycling applications

An occasional overcharge, even repeat, at the rates given in 1-A, beyond the prescribed times is not detrimental to VR 0.45 2/3 AF cells.

VR

0,45 2/3 AF

**B – Continuous charge**

Continuous rates depend on the required capacity, the recovery time allowed and the temperature.

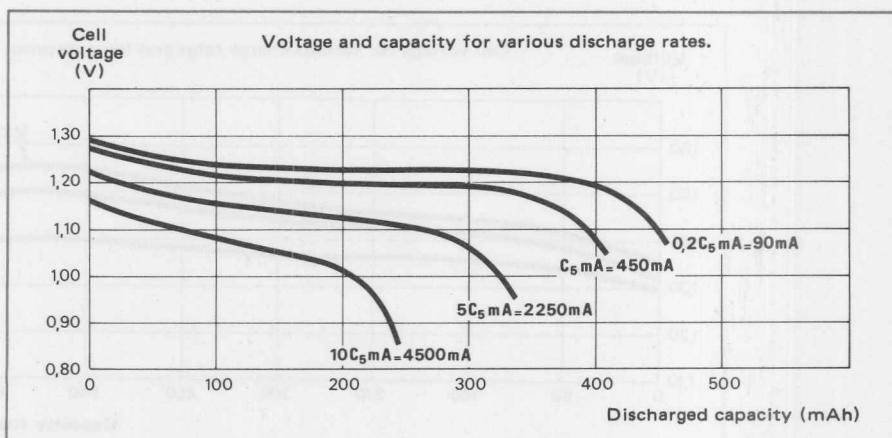
Recommended rates for a 24 hour recovery time between 0 °C and 30 °C.

Required capacity after 24 hours mAh	Appropriate rates mA
from 360 to 450	27
270 to 360	23
180 to 270	18
90 to 180	13,5
25 to 90	9
up to 25	4,5

**3. DISCHARGE**

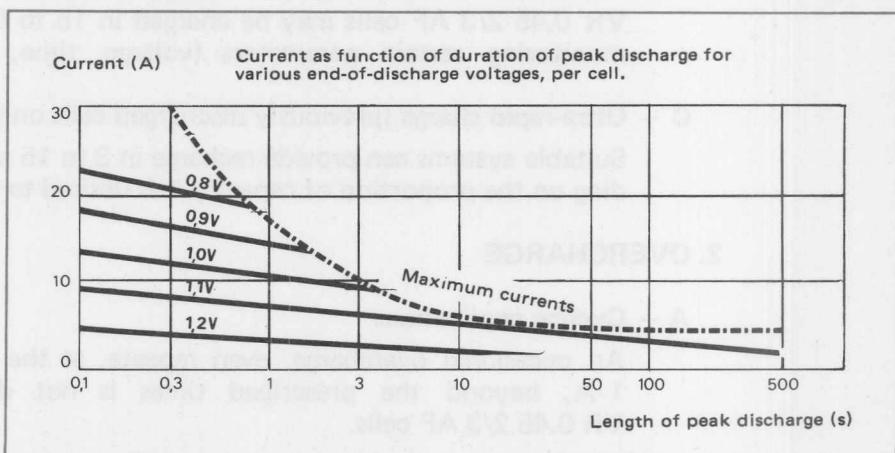
Continuous discharge at 20 ± 5 °C.

Maximum permissible continuous rate : 4.5 A.



Pulse discharge at 20 ± 5 °C.

Maximum power for a 0.3 s pulse : 18 W (U = 0.65 V - I = 28 A).



# 3 battery packs

## STANDARD BATTERY PACK ASSEMBLIES VR 0.45 2/3 AF.

Rated capacity : 0.45 Ah

Nominal voltage : 2.4 to 28.8 volts.

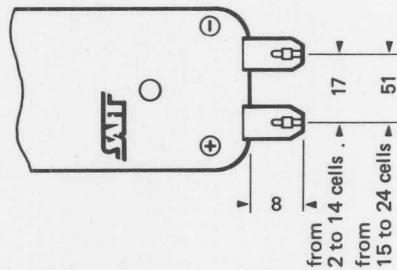
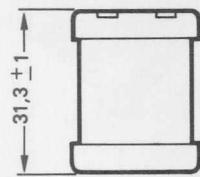
VR

0.45 2/3 AF

### DESCRIPTION

- Sleeved cells cemented side by side.
- Welded low resistance heavy duty connections.
- Top and bottom a.b.s. flanges, with fixing holes 4.5 mm dia.
- Outgoing solder tags (1 mm<sup>2</sup> wire).

### OVERALL DIMENSIONS (in mm)



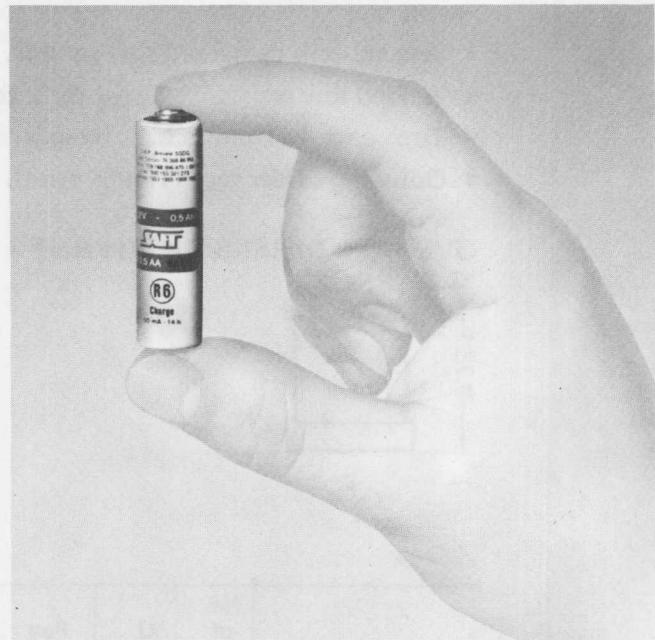
	No. of cells	U	Part	L ± 1	K ± 1	A ± 0,25	B ± 0,25	* W (g)
	2	2.4	121 624	37	20			46
	3	3.6	121 625	37	37			68
	4	4.8	121 626	37	37			91
	5	6	121 627	54	37	17		114
	6	7.2	121 628	54	37	17		137
	7	8.4	121 629	71	37	34		160
	8	9.6	121 630	71	37	34		182
	9	10.8	121 631	88	37	51		205
	10	12	121 632	88	37	51		228
	11	13.2	121 633	105	37	68		251
	12	14.4	121 634	105	37	68		275
	13	15.6	121 635	122	37	85		297
	14	16.8	121 636	122	37	85		320
	15	18	121 637	71	71	34	34	343
	16	19.2	121 638	71	71	34	34	365
	18	21.6	121 640	88	71	51	34	411
	20	24	121 642	88	71	51	34	457
	24	28.8	121 646	105	71	68	34	548

\* W (g) : max. weight in grams.

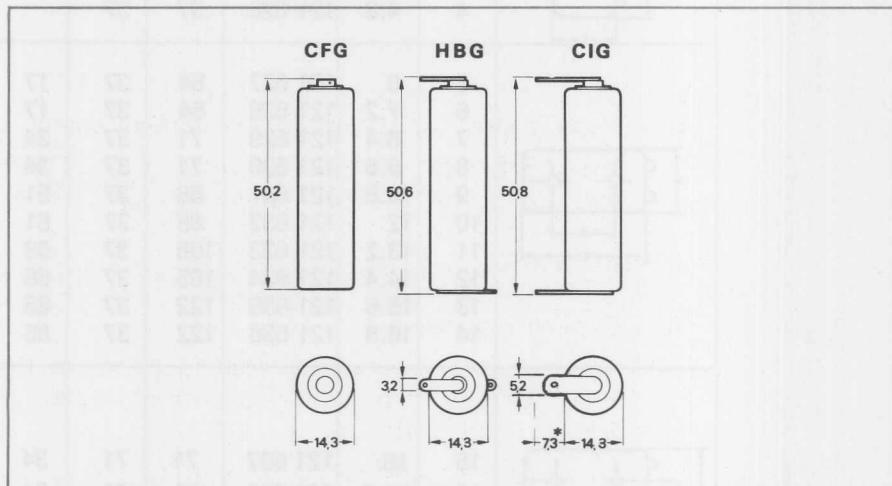
# CELL TYPE VR 0.5 AA

(CEI : KR 15 /51)

rated capacity  $C_5$  : 0.5 Ah.  
nominal voltage : 1.2 V.



## 1 mechanical characteristics



Max. dimensions in mm of sleeved cells (\* minimum).  
Cells without sleeves, reduce diameter by 0.3 mm. Max. weight : 24 g.

Standard nickel plated steel cell tags are suitable for continuous discharge rates up to 5 A.

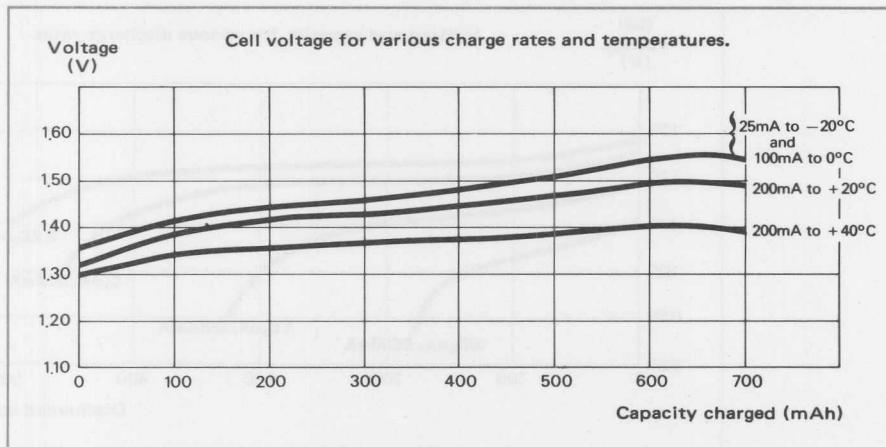
## 2 electrical performance

### 1. CHARGE

#### A — Normal charge (irrespective of the state of charge)

- from + 5 °C to + 50 °C :
  - normal charge : 50 mA for 14 hours
  - accelerated charge : up to 200 mA for 3.5 hours.
- from - 30 °C to + 5 °C.

Temperature °C	Maximum charging rates		Charging time hr
	mA	hr	
-30	15	34	
-20	25	21	
-10	50	11	
0	100	6	
+ 5	200	3.5	



#### B — Rapid charge (irrespective of the state of charge)

VR 0.5 AA cells may be charged in 15 to 60 minutes by monitoring certain parameters (voltage, time, temperature).

#### C — Ultra-rapid charge (previously discharged cells only)

Suitable systems can provide recharge in 3 to 15 minutes depending on the proportion of capacity it is desired to obtain.

### 2. OVERCHARGE

#### A — Cycling applications

An occasional overcharge, even repeated, at the rates given in 1-A, beyond the prescribed time is not detrimental to VR 0.5 AA cells.

### B – Continuous charge

Continuous rates depend on the required capacity, the recovery time allowed and the temperature.

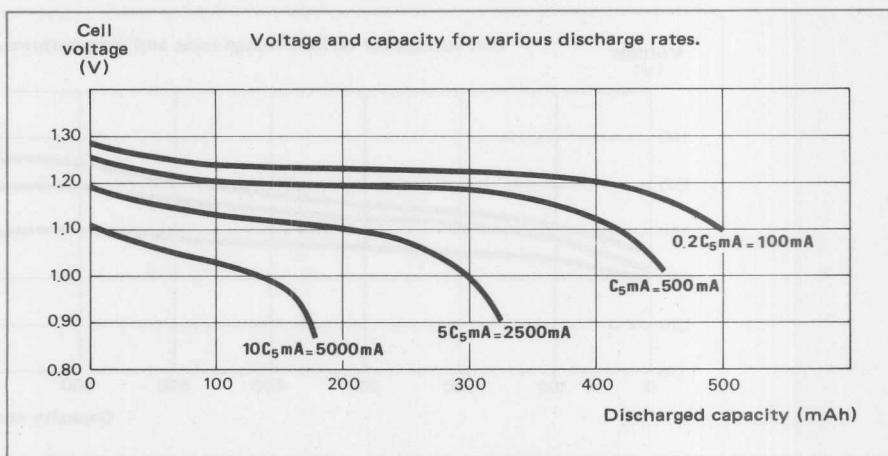
Recommended rates for a 24 hour recovery time between 0 °C and 30 °C.

Required capacity after 24 hours mAh	Appropriate rates mA
from 400 to 500	30
300 to 400	25
200 to 300	20
100 to 200	15
25 to 100	10
up to 25	5

### 3. DISCHARGE

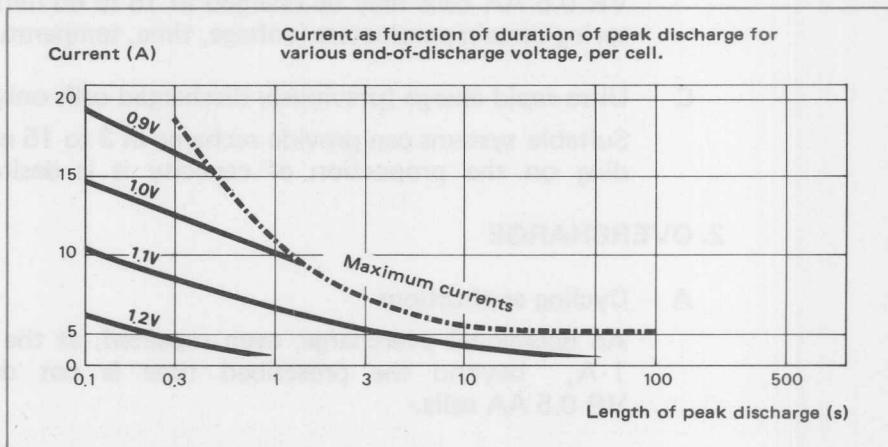
Continuous discharge at 20 ± 5 °C.

Maximum permissible continuous rate : 5 A.



Pulse discharge at 20 ± 5 °C.

Maximum power for a 0.3 s pulse : 16 W (U = 0.65 V - I = 24.5 A).



#### NOTE :

These curves apply to SAFT battery packs which are fitted with heavy duty connections ensuring minimum voltage drop.

## 3 battery packs

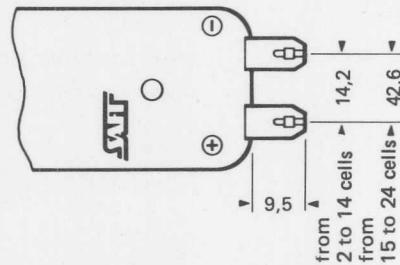
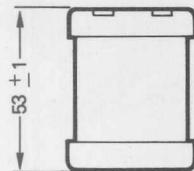
### STANDARD BATTERY PACK ASSEMBLIES VR 0.5 AA

Rated capacity : 0.5 Ah  
Nominal voltage : 2.4 to 28.8 volts.

#### DESCRIPTION

- Sleeved cells cemented side by side.
- Welded low resistance heavy duty connections.
- Top and bottom a.b.s. flanges, with fixing holes 4.5 mm dia.
- Outgoing solder tags (1 mm<sup>2</sup> wire).

#### OVERALL DIMENSIONS (in mm)



	No. of cells	U	Part	L ± 1	K ± 1	A ± 0,25	B ± 0,25	* W (g)
	2	2.4	120 409	31	16.8			55
	3	3.6	120 410	31	31			85
	4	4.8	120 243	31	31			104
	5	6	120 244	45.2	31	14.2		137
	6	7.2	120 245	45.2	31	14.2		154
	7	8.4	120 411	59.4	31	28.4		187
	8	9.6	120 412	59.4	31	28.4		203
	9	10.8	120 413	73.6	31	42.6		242
	10	12	120 246	73.6	31	42.6		258
	11	13.2	120 414	87.8	31	56.8		291
	12	14.4	120 415	87.8	31	56.8		308
	13	15.6	120 416	102	31	71		341
	14	16.8	120 417	102	31	71		357
	15	18	120 418	59.4	59.4	28.4	28.4	385
	16	19.2	120 419	59.4	59.4	28.4	28.4	407
	18	21.6	120 421	73.6	59.4	42.6	28.4	462
	20	24	120 247	73.6	59.4	42.6	28.4	533
	24	28.8	120 426	87.8	59.4	56.8	28.4	616

\* W (g) : max. weight in grams.

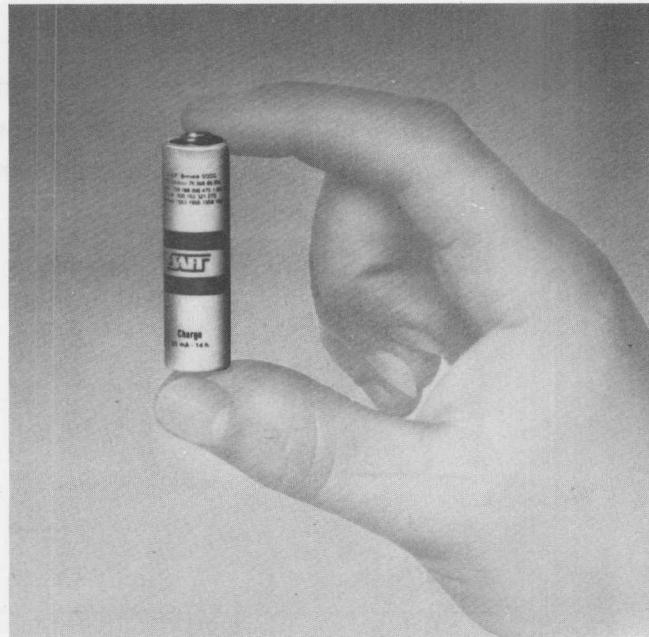
**VR**  
0.5 AA

# CELL TYPE VR 0,8 Af

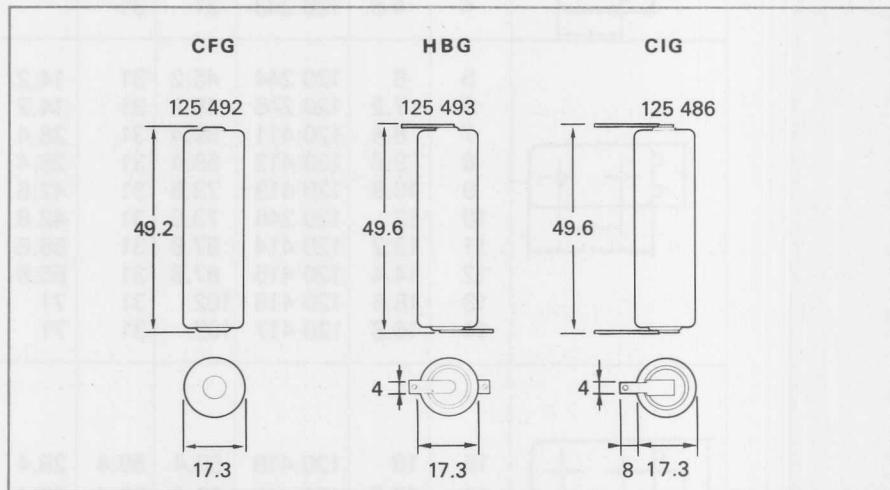
(CEI : KR18 / 50)

rated capacity  $C_5$  : 0.8 Ah.

nominal voltage : 1.2 V.



## 1 mechanical characteristics



Max. dimensions in mm of sleeved cells.

Cells without sleeves CFN, HBN and CIN, reduce diameter by 0.3mm. Max. weight : 37 g

Standard (nickel plated) tags are suitable for continuous discharge rates up to 8 A.

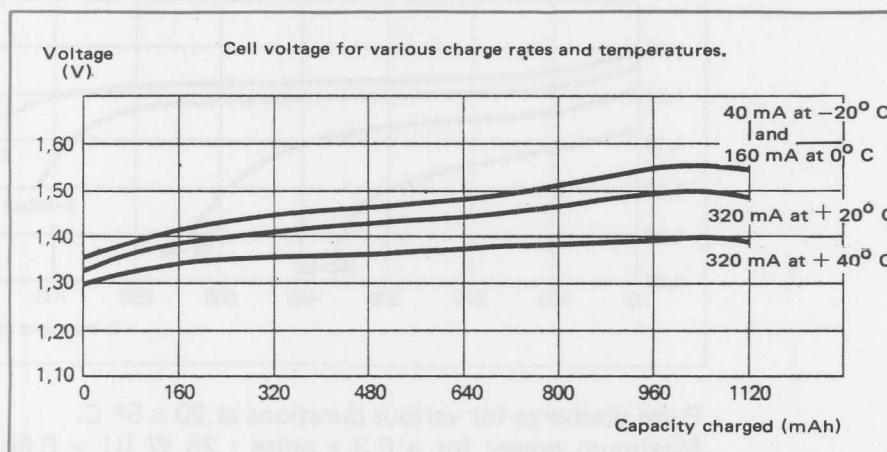
## 2 electrical performance

### 1. CHARGE

#### A -- Uncontrolled charge (irrespective of initial state of charge)

- from + 5° C to + 50° C
  - normal : 80 mA for 14 hours
  - accelerated : up to 320 mA for 3.5 hours
- from - 30° C to + 5° C :

Temperature °C	Maximum charge current mA	Charging time hr
- 30	24	34
- 20	40	21
- 10	80	11
0	160	6
+ 5	320	3.5



#### B -- Rapid charge (irrespective of initial state of charge)

VR 0.8 AF cells may be charged in 15 to 60 minutes by monitoring certain parameters (voltage, time, temperature).

#### C -- Ultra-rapid charge (previously discharged cells only)

Suitable systems can provide recharge in 3 to 15 minutes depending on the proportion of the capacity it is desired to obtain.

### 2. OVERCHARGE

#### A -- Overcharge in cycling

An occasion overcharge, even repeated, at the maximum rates shown in 1-A will not affect the performance of the VR 0.8 AF cell.

VR  
0.8 AF

### B - Continuous charge

Continuous charge rates depend on the capacity to be recharged after an occasional discharge, the time allowed for this recharge and the cell temperature.

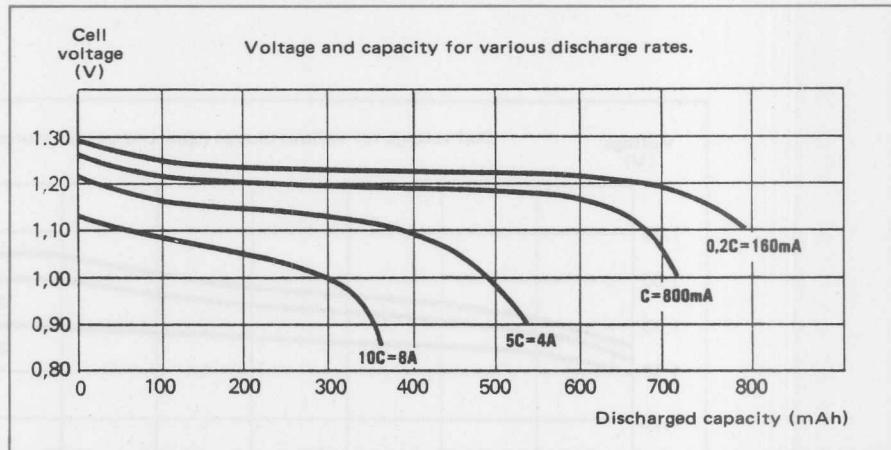
Example for recharge time of 24 hours between 0° C and + 30° C :

Capacity to be recharged in 24 hours mAh	Recommended continuous current mA
from 640 to 800	48
480 to 640	40
320 to 480	32
160 to 320	24
40 to 160	16
up to 40	8

### 3. DISCHARGE

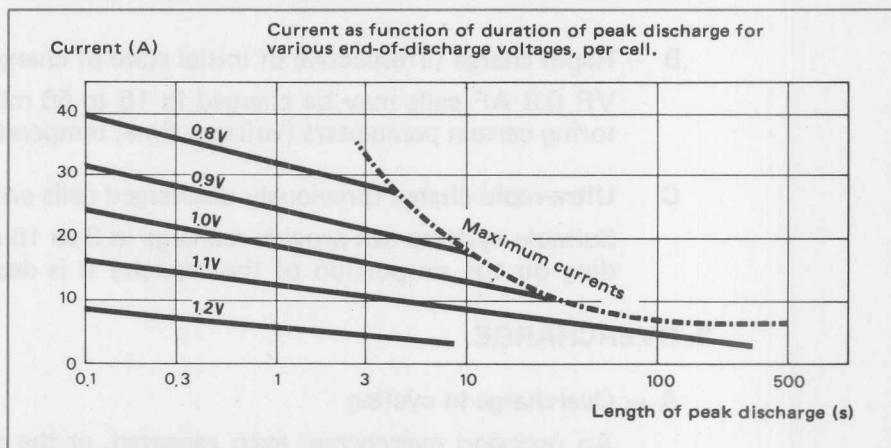
Continuous discharge at 20 ± 5° C.

Maximum permissible continuous rate : 8 A.



Pulse discharge for various durations at 20 ± 5° C.

Maximum power for a 0.3 s pulse : 25 W (U = 0.65 V - I = 39 A).



#### NOTE :

These curves apply to cells made up into SAFT standard batteries (described later).

### 3 battery packs

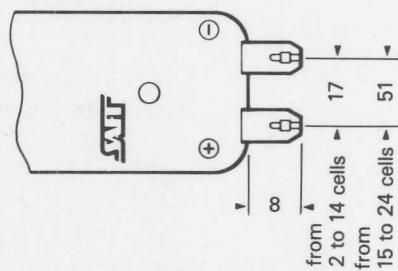
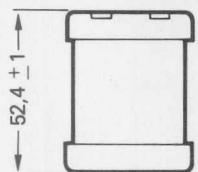
#### STANDARD BATTERIES OF VR 0.8 AF CELLS

Rated capacity  $C_5$  : 0.8 Ah.  
Nominal voltage : 2.4 to 28.8 volts.

#### DESCRIPTION

- Sleeved cells cemented side by side
- Electrically welded heavy duty connections.
- Top and bottom abs flanges, with fixing holes 4.5 mm dia.
- Outgoing solder lugs (1 mm<sup>2</sup> wire).

#### OVERALL DIMENSIONS (in mm)



**VR**  
0.8 AF

	No. of cells	U	Part	L ± 1	K ± 1	A ± 0,25	B ± 0,25	* W (g)
	2	2.4	124 207	37	20			78
	3	3.6	124 208	37	37			116
	4	4.8	124 209	37	37			155
	5	6	124 210	54	37	17		194
	6	7.2	124 211	54	37	17		234
	7	8.4	124 212	71	37	34		273
	8	9.6	124 213	71	37	34		311
	9	10.8	124 214	88	37	51		350
	10	12	124 215	88	37	51		389
	11	13.2	124 216	105	37	68		428
	12	14.4	124 217	105	37	68		467
	13	15.6	124 218	122	37	85		505
	14	16.8	124 219	122	37	85		544
	15	18	124 220	71	71	34	34	583
	16	19.2	124 221	71	71	34	34	621
	18	21.6	124 223	88	71	51	34	699
	20	24	124 225	88	71	51	34	778
	24	28.8	124 229	105	71	68	34	933

\* W (g) : max. weight in grams.

# CELL TYPE VR 1.2

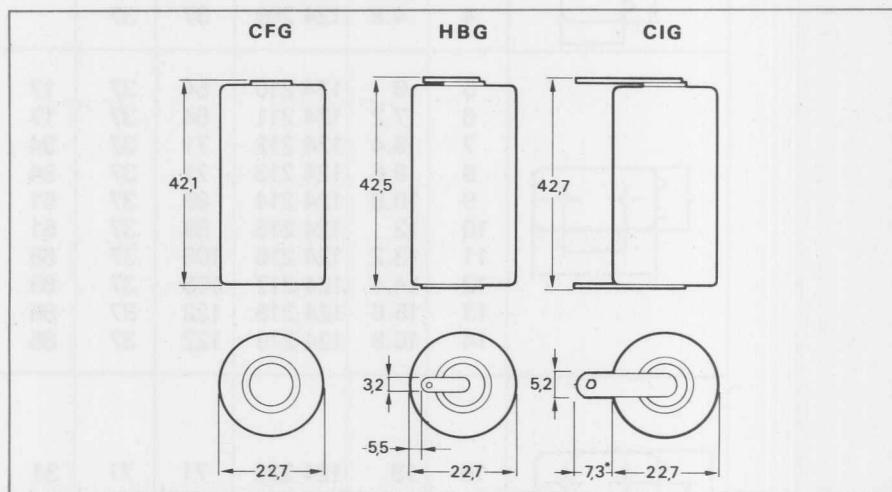
RR (Sub C)

(CEI : KR 23/43)

rated capacity  $C_5$  : 1.2 Ah.  
nominal voltage : 1.2 V.



## 1 mechanical characteristics



Max. dimensions in mm of sleeved cells (\*minimum).  
Cells without sleeves, reduce diameter by 0.3 mm. Max. weight : 51 g.

Standard nickel plated steel cell tags are suitable for continuous discharge rates up to 6 A.

SAFT standard VR 1.2 RR battery packs are provided with heavy duty connections which are suitable for the highest discharge rates of the cells.

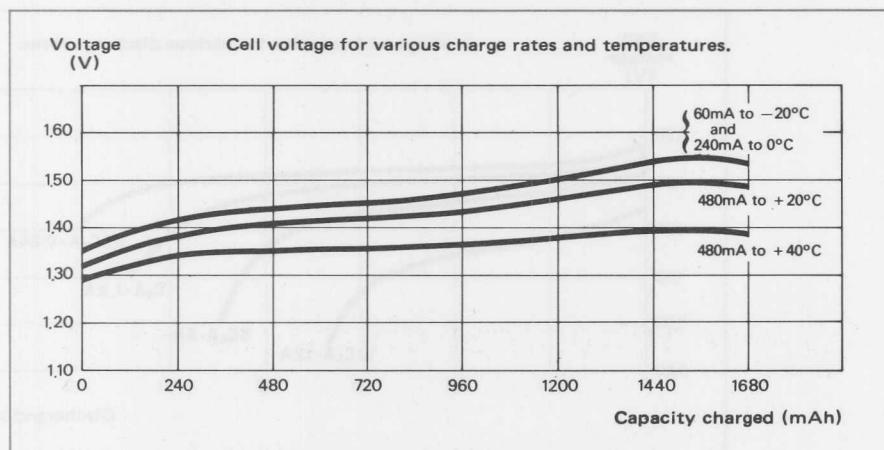
## 2 electrical performance

### 1. CHARGE

#### A – Normal charge (irrespective of the state of charge)

- from + 5 °C to + 50 °C :  
normal charge : 120 mA for 14 hours  
accelerated charge : up to 480 mA for 3.5 hours.
- from – 30 °C to + 5 °C.

Temperature °C	Maximum charging rates mA	Charging time hr
–30	36	34
–20	60	21
–10	120	11
0	240	6
+ 5	480	3.5



#### B – Rapid charge (irrespective of the state of charge)

VR 1.2 RR cells may be charged in 15 to 60 minutes by monitoring certain parameters (voltage, time, temperature).

#### C – Ultra-rapid charge (previously discharged cells only)

Suitable systems can provide recharge in 1 to 15 minutes depending on the proportion of capacity it is desired to obtain.

### 2. OVERCHARGE

#### A – Cycling applications

An occasional overcharge, even repeated, at the rates given in 1-A, beyond the prescribed times is not detrimental to VR 1.2 RR cells.

VR  
1.2 RR

### B – Continuous charge

Continuous rates depend on the required capacity, the recovery time allowed and the temperature.

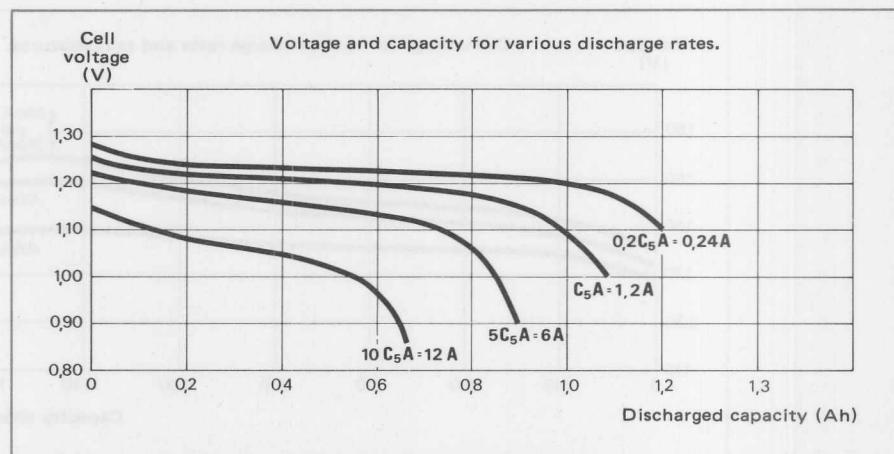
Recommended rates for a 24 hour recovery time between 0 °C and 30 °C.

Required capacity after 24 hours mAh	Appropriate rates mA
from 960 to 1200	72
720 to 960	60
480 to 720	48
240 to 480	36
60 to 240	24
up to 60	12

### 3. DISCHARGE

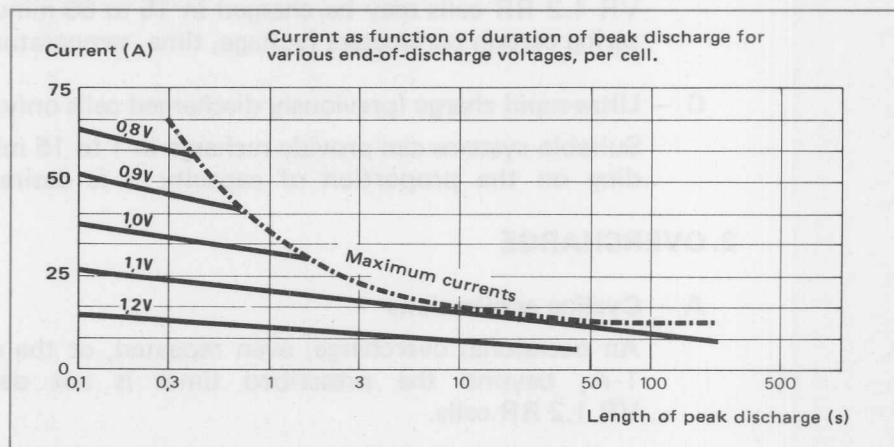
Continuous discharge at 20 ± 5 °C.

Maximum permissible continuous rate : 12 A.



Pulse discharge at 20 ± 5 °C.

Maximum power for a 0.3 s pulse : 50 W (U = 0.65 V - I = 77 A).



#### NOTE :

These curves apply to SAFT battery packs which are fitted with heavy duty connections ensuring minimum voltage drop.

## 3 battery packs

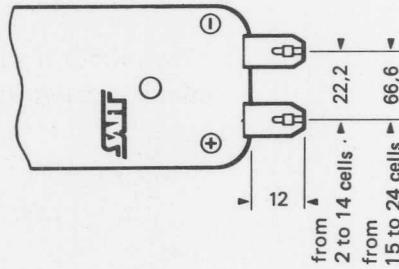
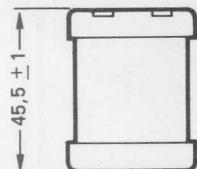
#### STANDARD BATTERY PACK ASSEMBLIES VR 1.2 RR

Rated capacity : 1.2 Ah  
Nominal voltage : 2.4 to 28.8 volts.

## DESCRIPTION

- Sleeved cells cemented side by side.
- Welded low resistance heavy duty connections.
- Top and bottom a.b.s. flanges, with fixing holes 4.5 mm dia.
- Outgoing solder tags (2 mm<sup>2</sup> wire).

**OVERALL DIMENSIONS (in mm)**



	No. of cells	U	Part	L $\pm 1$	K $\pm 1$	A $\pm 0,25$	B $\pm 0,25$	* W (g)
	2	2.4	120 427	47.5	25.2			110
	3	3.6	120 428	47.5	47.5			176
	4	4.8	120 196	47.5	47.5			214
	5	6	120 197	69.6	47.5	22.2		286
	6	7.2	120 198	69.6	47.5	22.2		324
	7	8.4	120 429	91.8	47.5	44.4		390
	8	9.6	120 430	91.8	47.5	44.4		429
	9	10.8	120 431	114	47.5	66.6		500
	10	12	120 199	114	47.5	66.6		539
	11	13.2	120 432	136.2	47.5	88.8		610
	12	14.4	120 200	136.2	47.5	88.8		649
	13	15.6	120 433	158.4	47.5	111		715
	14	16.8	120 000	158.4	47.5	111		753
	15	18	120 434	91.8	91.8	44.4	44.4	808
	16	19.2	120 435	91.8	91.8	44.4	44.4	863
	18	21.6	120 437	114	91.8	66.6	44.4	973
	20	24	120 201	114	91.8	66.6	44.4	1078
	24	28.8	120 442	136.2	91.8	88.8	44.4	1292

Maximum  
charge rate  
240 mA

\* W (g) : max. weight in grams.

**UR**  
1.2 RR

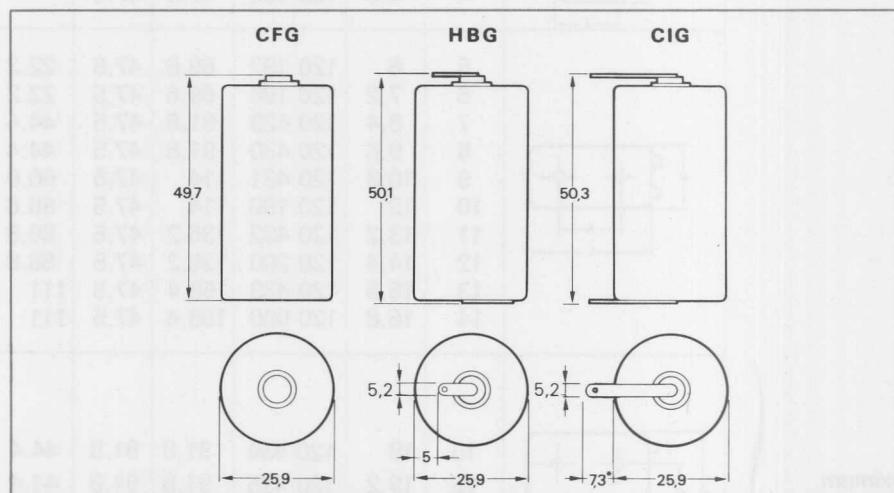
# CELL TYPE VR 2 C

(CEI : KR 27/50)

rated capacity  $C_5$  : 2 Ah.  
nominal voltage : 1.2 V.



## 1 mechanical characteristics



Max. dimensions in mm of sleeved cells (\*minimum).  
Cells without sleeves, reduce diameter by 0.3 mm. Max. weight : 77 g.

Standard nickel plated steel cell tags are suitable for continuous discharge rates up to 14 A.

SAFT standard VR 2 C battery packs are provided with heavy duty connections which are suitable for the highest discharge rates of the cells.

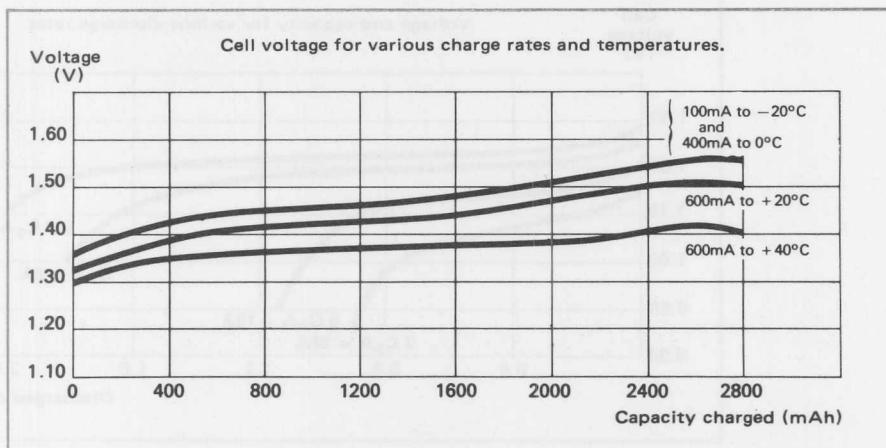
## 2 electrical performance

### 1. CHARGE

#### A – Normal charge (irrespective of the state of charge)

- from + 5 °C to + 50 °C :  
normal charge : 200 mA for 14 hours  
accelerated charge : up to 600 mA for 4 hours
- from – 30 °C to + 5 °C.

Temperature	Maximum charging rates	Charging time
°C	mA	hr
–30	60	34
–20	100	21
–10	200	11
0	400	6
+ 5	600	4



#### B – Rapid charge (irrespective of the state of charge)

VR 2 C cells may be charged in 30 to 60 minutes by monitoring certain parameters (voltage, time, temperature).

### 2. OVERCHARGE

#### A – Cycling applications

An occasional overcharge, even repeated, at the rates given in 1-A, beyond the prescribed times is not detrimental to VR 2 C cells.

VR  
2 C

**B – Continuous charge**

Continuous rates depend on the required capacity, the recovery time allowed and the temperature.

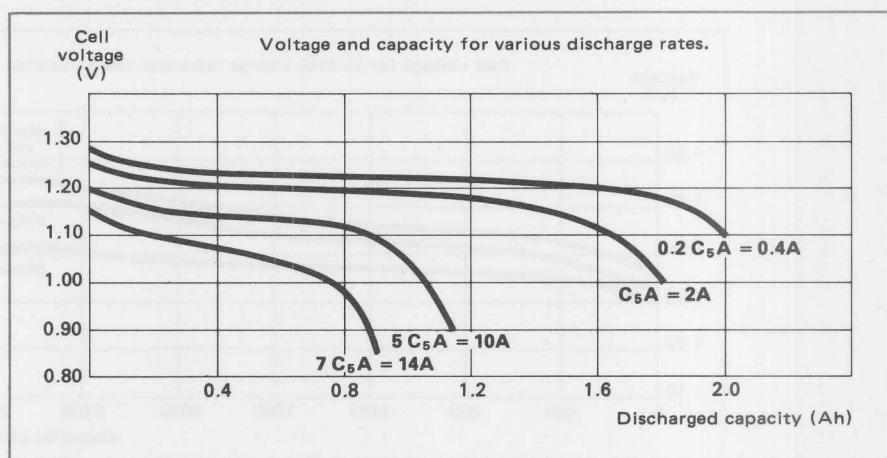
Recommended rates for a 24 hour recovery time between 0 °C and 30 °C.

Required capacity after 24 hours mAh	Appropriate rates mA
from 1600 to 2000	120
1200 to 1600	100
800 to 1200	80
400 to 800	60
100 to 400	40
up to 100	20

**3. DISCHARGE**

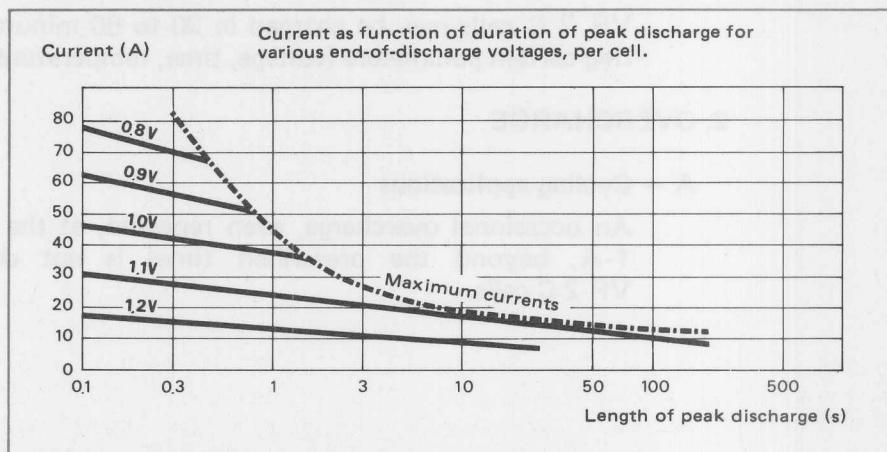
Continuous discharge at  $20 \pm 5$  °C.

Maximum permissible continuous rate : 14 A.



Pulse discharge at  $20 \pm 5$  °C.

Maximum power for a 0.3 s pulse : 60 W ( $U = 0.65$  V -  $I = 93$  A).

**NOTE :**

These curves apply to SAFT battery packs which are fitted with heavy duty connections ensuring minimum voltage drop.

### 3 battery packs

#### STANDARD BATTERY PACK ASSEMBLIES VR 2 C

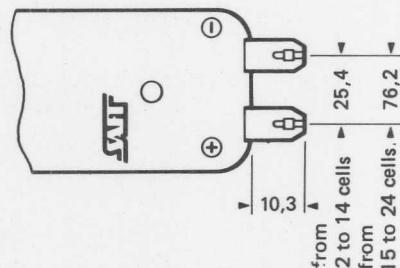
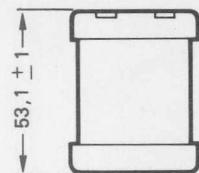
Rated capacity : 2 Ah

Nominal voltage : 2.4 to 28.8 volts.

#### DESCRIPTION

- Sleeved cells cemented side by side.
- Welded low resistance heavy duty connections.
- Top and bottom a.b.s. flanges, with fixing holes 4.5 mm dia.
- Outgoing solder tags (2 mm<sup>2</sup> wire).

#### OVERALL DIMENSIONS (in mm)



VR  
2 C

	No. of cells	U	Part	L ± 1	K ± 1	A ± 0,25	B ± 0,25	* W (g)
	2	2.4	120 479	53.8	28.4			159
	3	3.6	120 480	53.8	53.8			264
	4	4.8	120 203	53.8	53.8			319
	5	6	120 204	79.2	53.8	25.4		423
	6	7.2	120 205	79.2	53.8	25.4		478
	7	8.4	120 481	104.6	53.8	50.8		583
	8	9.6	120 482	104.6	53.8	50.8		638
	9	10.8	120 483	130	53.8	76.2		742
	10	12	120 206	130	53.8	76.2		803
	11	13.2	120 484	155.4	53.8	101.6		902
	12	14.4	120 485	155.4	53.8	101.6		957
	13	15.6	120 486	180.8	53.8	127		1061
	14	16.8	120 487	180.8	53.8	127		1116
	15	18	120 488	104.6	104.6	50.8	50.8	1199
	16	19.2	120 489	104.6	104.6	50.8	50.8	1276
	17	20.4	120 490	130	104.6	76.2	50.8	1364
	18	21.6	120 491	130	104.6	76.2	50.8	1441
	19	22.8	120 492	130	104.6	76.2	50.8	1518
	20	24	120 207	130	104.6	76.2	50.8	1595
	24	28.8	120 496	155.4	104.6	101.6	50.8	1914

\* W (g) : max. weight in grams.

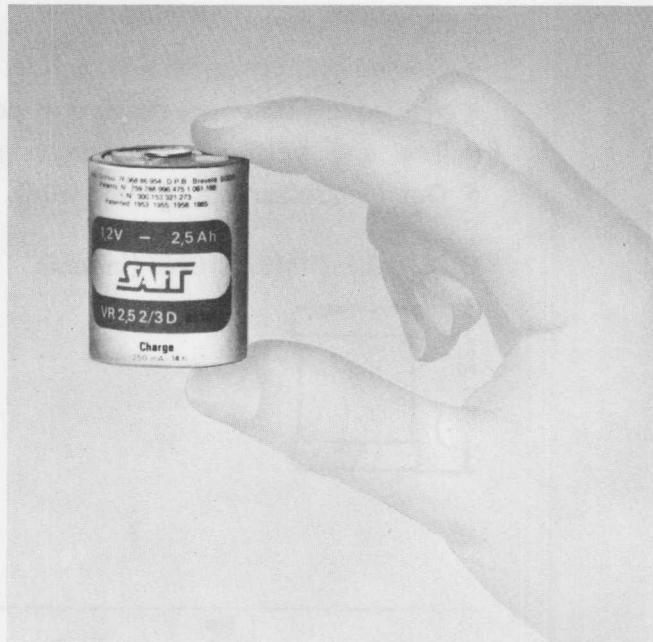
Maximum charge rate  
300 mA

# CELL TYPE VR 2.5

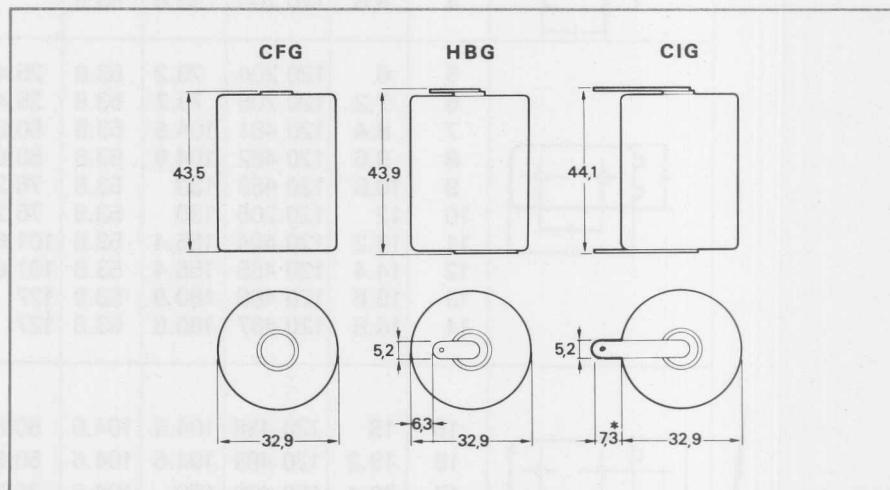
2/3 D

(CEI : KR 35/44)

rated capacity  $C_5$  : 2.5 Ah.  
nominal voltage : 1.2 V.



## 1 mechanical characteristics



Max. dimensions in mm of sleeved cells (\*minimum).  
Cells without sleeves, reduce diameter by 0.2 mm. Max. weight : 105 g.

Standard nickel plated steel cell tags are suitable for continuous discharge rates up to 15 A.

SAFT standard VR 2.5 2/3 D battery packs are provided with heavy duty connections which are suitable for the highest discharge rates of the cells.

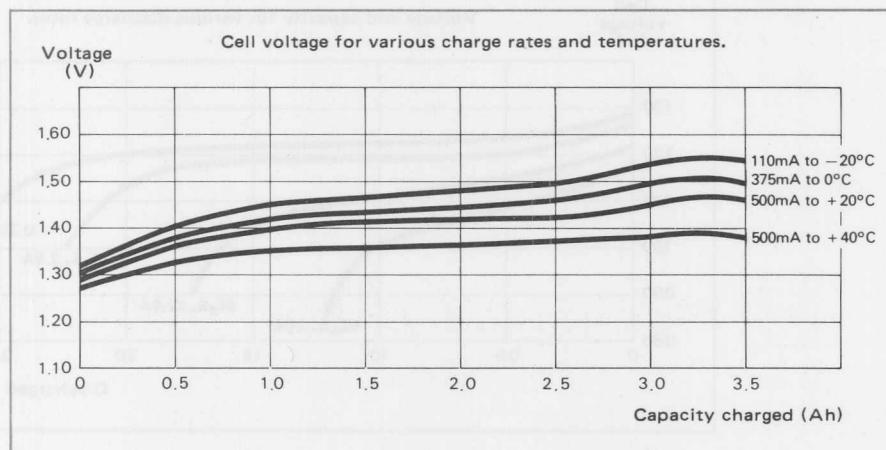
## 2 electrical performance

### 1. CHARGE

#### A – Normal charge (irrespective of the state of charge)

- from + 5 °C to + 50 °C :
  - normal charge : 250 mA for 14 hours
  - accelerated charge : up to 500 mA for 7 hours.
- from – 30 °C to + 5 °C.

Temperature	Maximum charging rates	Charging time
°C	mA	hr
-30	60	42
-20	110	24
-10	200	14
0	375	8
+ 5	500	7



#### B – Rapid charge (irrespective of the state of charge)

VR 2.5 2/3 D cells may be charged in 30 to 60 minutes by monitoring certain parameters (voltage, time, temperature).

### 2. OVERCHARGE

#### A – Cycling applications

An occasional overcharge, even repeated, at the rates given in 1-A, beyond the prescribed times is not detrimental to VR 2.5 2/3 D cells.

VR

2.5 2/3 D

## B – Continuous charge

Continuous rates depend on the required capacity, the recovery time allowed and the temperature.

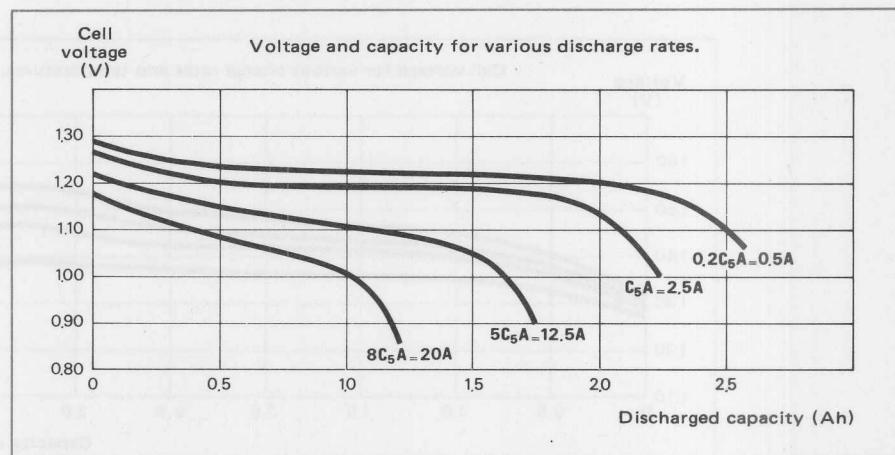
Recommended rates for a 24 hour recovery time between 0 °C and 30 °C.

Required capacity after 24 hours	Appropriate rates
Ah	mA
from 2 to 2.5	150
1.5 to 2	125
1 to 1.5	100
0.5 to 1	75
0.125 to 0.5	50
up to 0.125	25

## 3. DISCHARGE

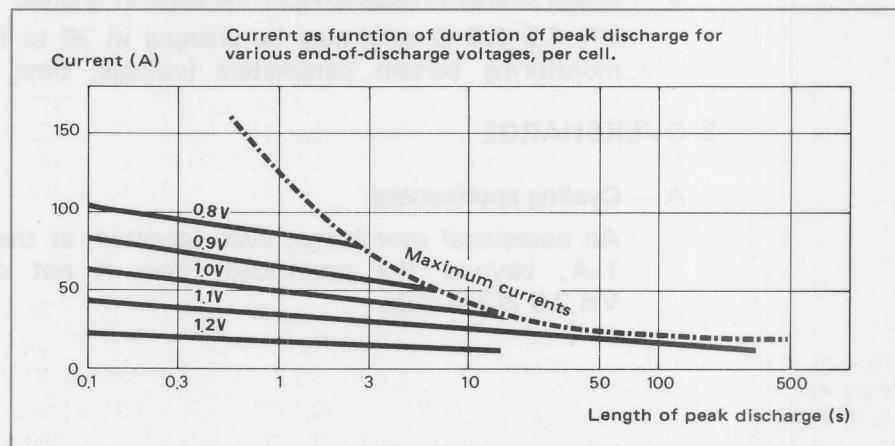
Continuous discharge at 20 ± 5 °C.

Maximum permissible continuous rate : 20 A.



Pulse discharge at 20 ± 5 °C.

Maximum power for a 0.3 s pulse : 78 W (U=0.65 V - I=120 A).



### NOTE :

These curves apply to SAFT battery packs which are fitted with heavy duty connections ensuring minimum voltage drop.

### 3 battery packs

#### STANDARD BATTERY PACK ASSEMBLIES VR 2.5 2/3 D

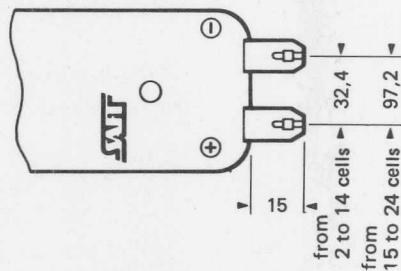
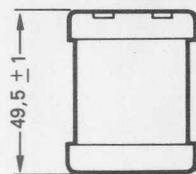
Rated capacity : 2.5 Ah

Nominal voltage : 2.4 to 28.8 volts.

#### DESCRIPTION

- Sleeved cells cemented side by side.
- Welded low resistance heavy duty connections.
- Top and bottom a.b.s. flanges, with fixing holes 6.5 mm dia.
- Outgoing solder tags (3 mm<sup>2</sup> wire).

#### OVERALL DIMENSIONS (in mm)



	No. of cells	U	Part	L ± 1	K ± 1	A ± 0,25	B ± 0,25	* W (g)
	2	2.4	122 761	69.8	37.4			232
	3	3.6	122 762	69.8	69.8			383
	4	4.8	122 763	69.8	69.8			464
	5	6	122 764	102.2	69.8	32.4		621
	6	7.2	122 765	102.2	69.8	32.4		696
	7	8.4	122 766	134.6	69.8	64.8		848
	8	9.6	122 767	134.6	69.8	64.8		922
	9	10.8	122 768	167	69.8	97.2		1080
	10	12	122 157	167	69.8	97.2		1155
	11	13.2	122 769	199.4	69.8	129.6		1312
	12	14.4	122 770	199.4	69.8	129.6		1387
	13	15.6	122 771	231.8	69.8	162		1544
	14	16.8	122 772	231.8	69.8	162		1608
	15	18	122 773	134.6	134.6	64.8	64.8	1743
	16	19.2	122 774	134.6	134.6	64.8	64.8	1845
	18	21.6	122 776	167	134.6	97.2	64.8	2099
	20	24	122 817	167	134.6	97.2	64.8	2310
	24	28.8	122 781	199.4	134.6	129.6	64.8	2774

Maximum charge rate  
250 mA

\* W (g) : max. weight in grams.

VR  
2.5 2/3 D

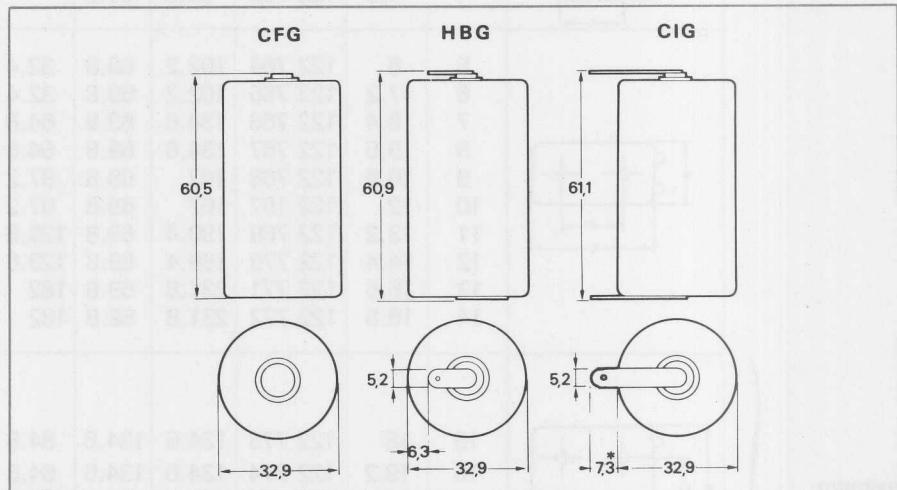
# CELL TYPE VR 4 D

(CEI : KR 35/62)

rated capacity  $C_5$  : 4 Ah.  
nominal voltage : 1.2 V.



## 1 mechanical characteristics



Max. dimensions in mm of sleeved cells (\*minimum).  
Cells without sleeves, reduce diameter by 0.3 mm. Max. weight : 150 g.

Standard nickel plated steel cell tags are suitable for continuous discharge rates up to 15 A.

SAFT standard VR 4 D battery packs are provided with heavy duty connections which are suitable for the highest discharge rates of the cells.

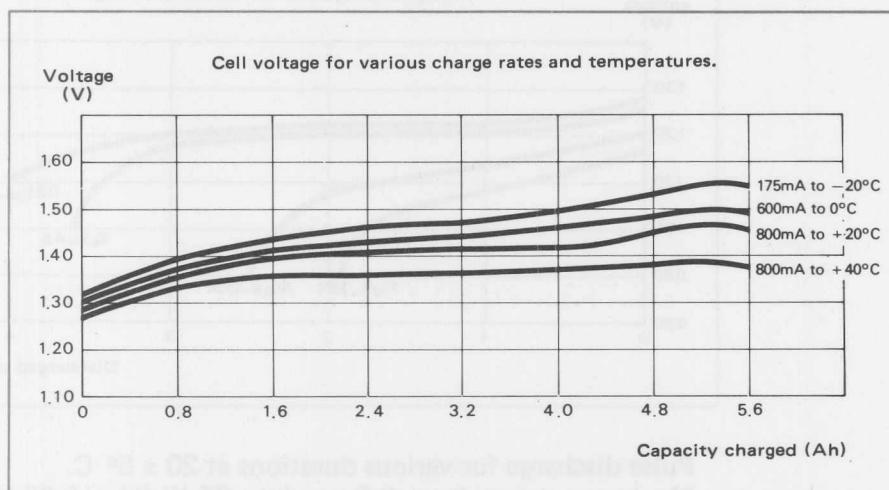
## 2 electrical performance

### 1. CHARGE

#### A – Normal charge (irrespective of the state of charge)

- from + 5 °C to + 50 °C :
  - normal charge : 400 mA for 14 hours
  - accelerated charge : up to 800 mA for 7 hours.
- from – 30 °C to + 5 °C.

Temperature	Maximum charging rates	Charging time
°C	mA	hr
–30	95	42
–20	175	24
–10	320	14
0	600	8
+ 5	800	7



#### B – Rapid charge (irrespective of the state of charge)

VR 4 D cells may be charged in 30 to 60 minutes by monitoring certain parameters (voltage, time, temperature).

SAFT must be consulted on any application involving rapid charging of VR 4 D cells and batteries.

### 2. OVERCHARGE

#### A – Cycling applications

An occasional overcharge, even repeated, at the rates given in 1-A, beyond the prescribed times is not detrimental to VR 4 D cells.

**VR**

**4 D**

## B – Continuous charge

Continuous charge rates depend on the capacity to be recharged after an occasional discharge, the time allowed for this discharge and the cell temperature.

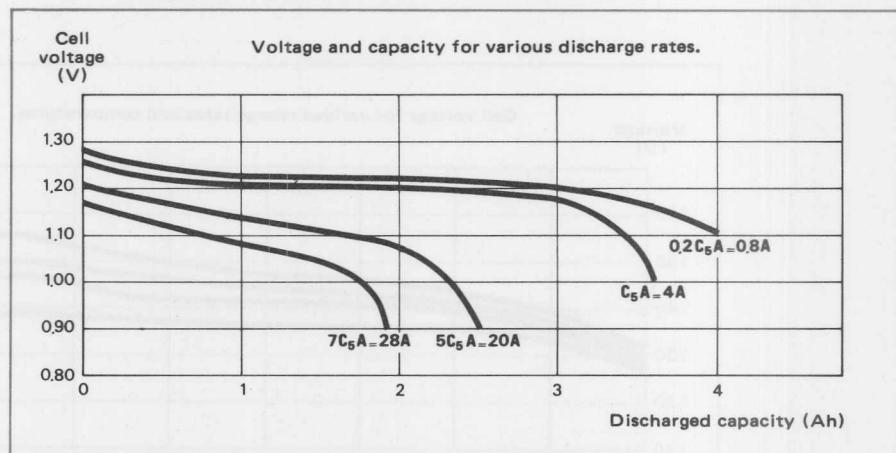
Recommended rates for a 24 hour recovery time between 0 °C and 30 °C.

Required capacity after 24 hours Ah	Appropriate rates mA
from 3.2 to 4	240
2.4 to 3.2	200
1.6 to 2.4	160
0.8 to 1.6	120
0.2 to 0.8	80
up to 0.2	40

## 3. DISCHARGE

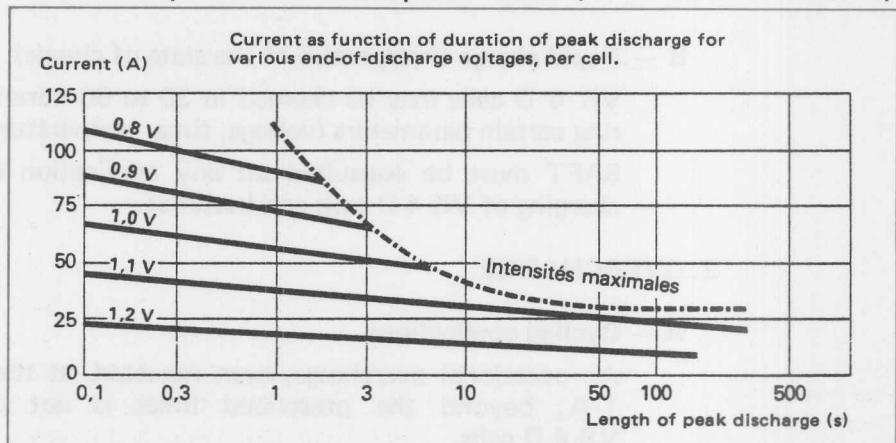
Continuous discharge at 20 ± 5 °C.

Maximum permissible continuous rate : 28 A.



Pulse discharge for various durations at 20 ± 5° C.

Maximum power for a 0.3 s pulse : 85 W (U = 0.65 V - I = 131 A).



### NOTE :

These curves apply to SAFT battery packs which are fitted with heavy duty connections ensuring minimum voltage drop.

VR

4 D

### 3 battery packs

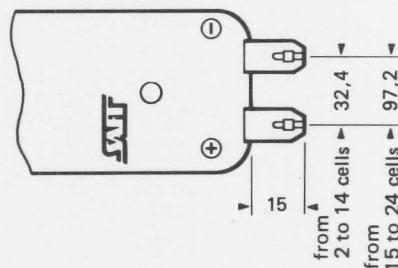
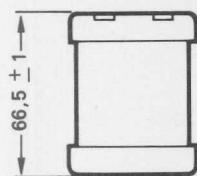
#### STANDARD BATTERY PACK ASSEMBLIES VR 4 D

Rated capacity : 4 Ah  
 Nominal voltage : 2.4 to 28.8 volts.

#### DESCRIPTION

- Sleeved cells cemented side by side.
- Welded low resistance heavy duty connections.
- Top and bottom a.b.s. flanges, with fixing holes 6.5 mm dia.
- Outgoing solder tags (3 mm<sup>2</sup> wire).

#### OVERALL DIMENSIONS (in mm)



	No. of cells	U	Part	L ± 1	K ± 1	A ± 0,25	B ± 0,25	* W (g)
	2	2.4	120 443	69.8	37.4			324
	3	3.6	120 444	69.8	69.8			522
	4	4.8	120 209	69.8	69.8			649
	5	6	120 210	102.2	69.8	32.4		852
	6	7.2	120 211	102.2	69.8	32.4		973
	7	8.4	120 445	134.6	69.8	64.8		1171
	8	9.6	120 446	134.6	69.8	64.8		1292
	9	10.8	120 447	167	69.8	97.2		1496
	10	12	120 212	167	69.8	97.2		1617
	11	13.2	120 448	199.4	69.8	129.6		1820
	12	14.4	120 449	199.4	69.8	129.6		1941
	13	15.6	120 450	231.8	69.8	162		2145
	14	16.8	120 451	231.8	69.8	162		2255
	15	18	120 452	134.6	134.6	64.8	64.8	2436
	16	19.2	120 453	134.6	134.6	64.8	64.8	2585
	18	21.6	120 455	167	134.6	97.2	64.8	2931
	20	24	120 213	167	134.6	97.2	64.8	3234
	24	28.8	120 460	199.4	134.6	129.6	64.8	3883

Maximum charge rate  
400 mA

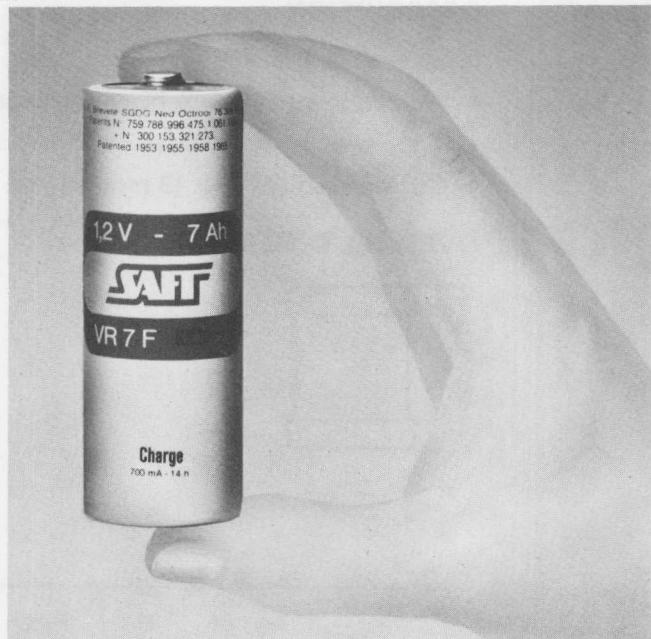
\* W (g) : max. weight in grams.

VR  
4 D

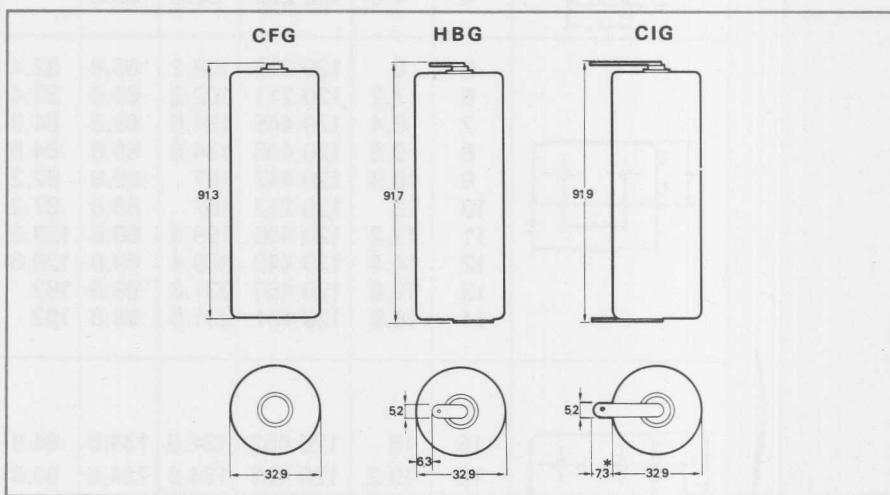
# CELL TYPE VR 7 F

(CEI : KR 35/92)

rated capacity  $C_5$  : 7 Ah.  
nominal voltage : 1.2 V.



## 1 mechanical characteristics



Max. dimensions in mm of sleeved cells (\*minimum).  
Cells without sleeves, reduce diameter by 0.3 mm. Max. weight : 240 g.

Standard nickel plated steel cell tags are suitable for continuous discharge rates up to 15 A.

SAFT standard VR 7 F battery packs are provided with heavy duty connections which are suitable for the highest discharge rates of the cells.

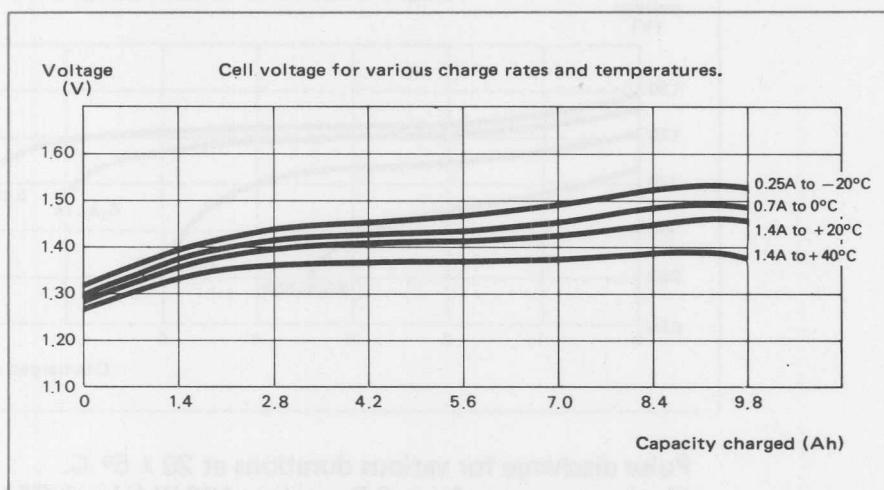
## 2 electrical performance

### 1. CHARGE

#### A — Normal charge (irrespective of the state of charge)

- from + 5 °C to + 50 °C :  
normal charge : 700 mA for 14 hours  
accelerated charge : up to 1.4 A for 7 hours.
- from - 30 °C to + 5 °C.

Temperature °C	Maximum charging rates		Charging time hr
	mA		
-30	150		47
-20	245		30
-10	380		20
0	700		12
+ 5	1400		7



#### B -- Rapid charge (irrespective of the state of charge)

VR 7 F cells may be charged in 60 minutes by monitoring certain parameters (voltage, time, temperature).

SAFT must be consulted on any application involving rapid charging of VR 7 F cells and batteries.

### 2. OVERCHARGE

#### A — Cycling applications

An occasional overcharge, even repeated, at the rates given in 1-A, beyond the prescribed times is not detrimental to VR 7 F cells.

VR  
7 F

## B – Continuous charge

Continuous charge rates depend on the capacity to be recharged after an occasional discharge, the time allowed for this discharge and the cell temperature.

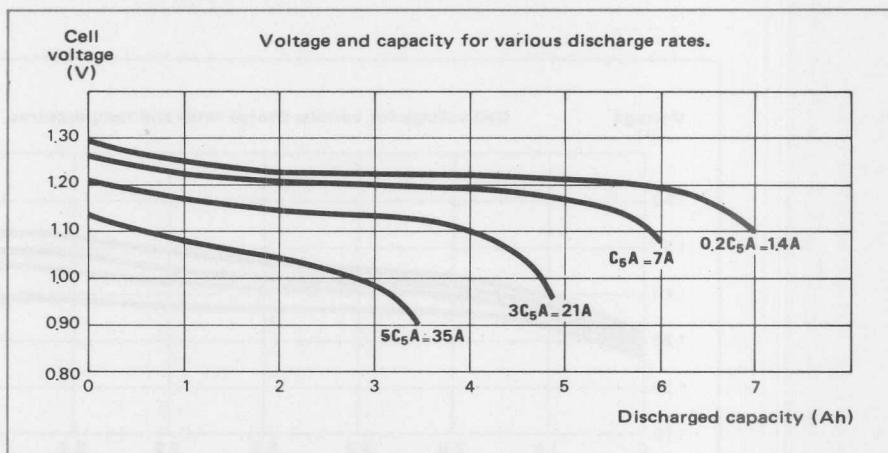
Recommended rates for a 24 hour recovery time between 0 °C and 30 °C.

Required capacity after 24 hours Ah	Appropriate rates mA
from 5.6 to 7	420
4.2 to 5.6	350
2.8 to 4.2	280
1.4 to 2.8	210
0.4 to 1.4	140
up to 0.4	70

## 3. DISCHARGE

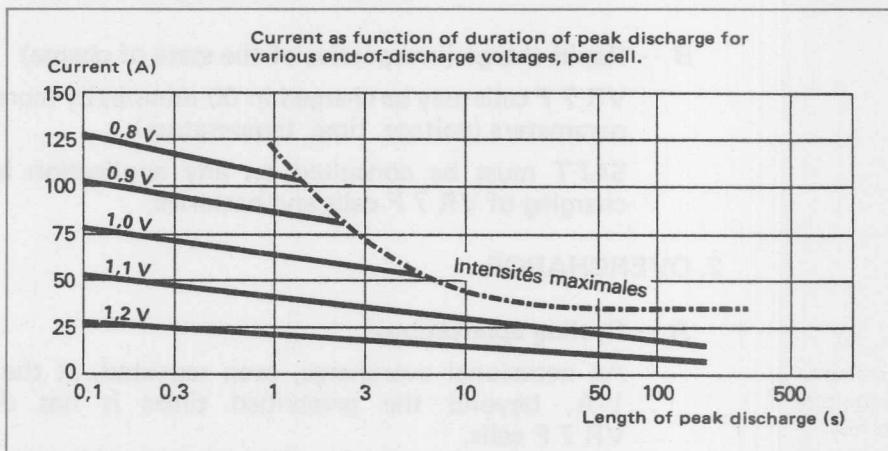
Continuous discharge at  $20 \pm 5$  °C.

Maximum permissible continuous rate : 35 A.



Pulse discharge for various durations at  $20 \pm 5$  °C.

Maximum power for a 0.3 s pulse : 100 W ( $U = 0.65$  V -  $I = 154$  A).



### NOTE :

These curves apply to SAFT battery packs which are fitted with heavy duty connections ensuring minimum voltage drop.

# 3 battery packs

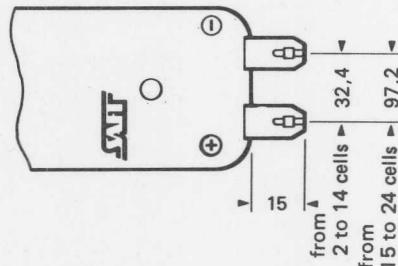
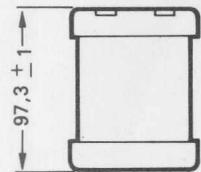
## STANDARD BATTERY PACK ASSEMBLIES VR 7 F

Rated capacity : 7 Ah  
 Nominal voltage : 2.4 to 28.8 volts.

### DESCRIPTION

- Sleeved cells cemented side by side.
- Welded low resistance heavy duty connections.
- Top and bottom a.b.s. flanges, with fixing holes 6.5 mm dia.
- Outgoing solder tags (3 mm<sup>2</sup> wire).

### OVERALL DIMENSIONS (in mm)



	No. of cells	U	Part	L ± 1	K ± 1	A ± 0,25	B ± 0,25	* W (g)
	2	2.4	120 461	69.8	37.4			500
	3	3.6	120 462	69.8	69.8			814
	4	4.8	120 215	69.8	69.8			1012
	5	6	120 216	102.2	69.8	32.4		1320
	6	7.2	120 217	102.2	69.8	32.4		1518
	7	8.4	120 463	134.6	69.8	64.8		1826
	8	9.6	120 464	134.6	69.8	64.8		2024
	9	10.8	120 465	167	69.8	97.2		2332
	10	12	120 185	167	69.8	97.2		2530
	11	13.2	120 466	199.4	69.8	129.6		2838
	12	14.4	120 467	199.4	69.8	129.6		3036
	13	15.6	120 468	231.8	69.8	162		3344
	14	16.8	120 469	231.8	69.8	162		3542
	15	18	120 470	134.6	134.6	64.8	64.8	3806
	16	19.2	120 471	134.6	134.6	64.8	64.8	4048
	17	20.4	120 472	167	134.6	97.2	64.8	4334
	18	21.6	120 473	167	134.6	97.2	64.8	4576
	19	22.8	120 474	167	134.6	97.2	64.8	4818
	20	24	120 218	167	134.6	97.2	64.8	5060
	24	28.8	120 478	199.4	134.6	129.6	64.8	6072

\* W (g) : max. weight in grams.

Maximum charge rate  
700 mA

VR  
7 F

# CELL TYPE VR 10

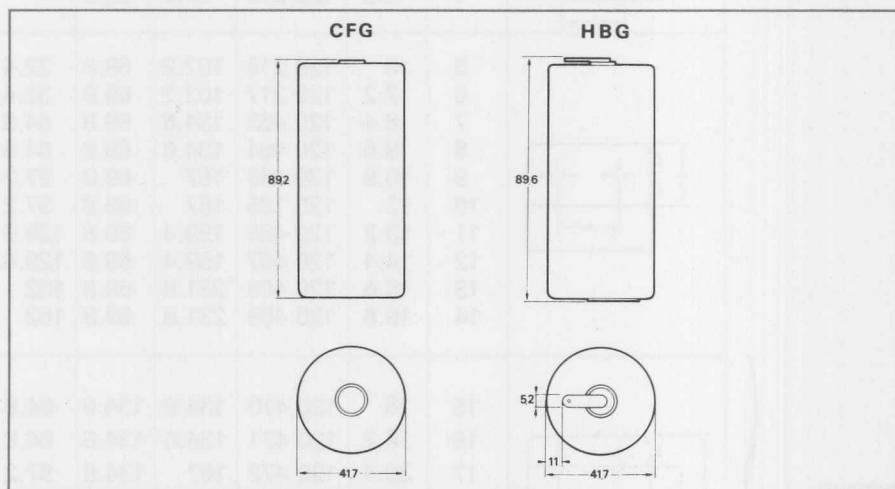
SF

(CEI : KR 44/91)

rated capacity  $C_5$  : 10 Ah.  
nominal voltage : 1.2 V.



## 1 mechanical characteristics



Max. dimensions in mm of sleeved cells (\* minimum).  
Cells without sleeves, reduce diameter by 0.3 mm. Max. weight : 400 g.

Standard nickel plated steel cell tags are suitable for continuous discharge rates up to 15 A.

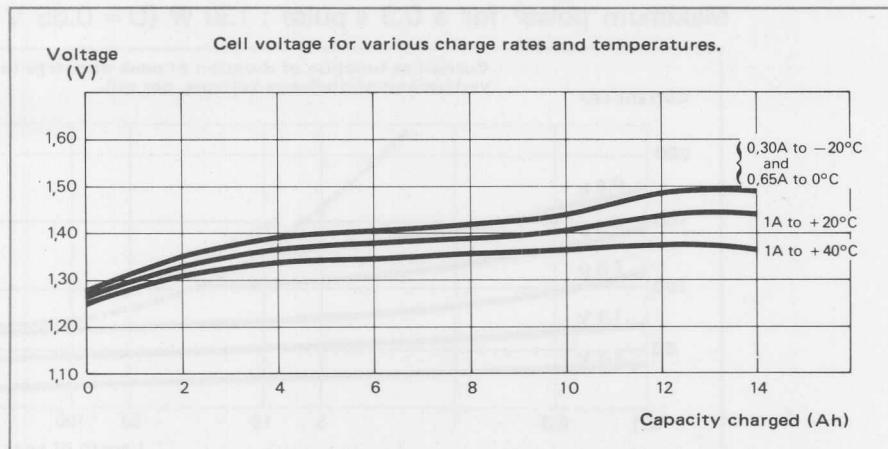
SAFT standard VR 10 SF battery packs are provided with heavy duty connections which are suitable for the highest discharge rates of the cells.

## 2 electrical performance

### 1. CHARGE (irrespective of the state of charge)

- from + 5 °C to + 50 °C :  
normal charge : 1 A for 14 hours.
- from - 30 °C to + 5 °C.

Temperature °C	Maximum charging rates		Charging time hr
	mA	hr	
-30	200	50	
-20	300	35	
-10	450	25	
0	650	19	
+ 5	1000	14	



### 2. OVERCHARGE

#### A – Cycling applications

Occasional overcharges at 1 ampere will not affect the performance of the VR 10 SF cell. However, the overcharge current must not exceed 600 mA in batteries of more than 14 cells.

#### B – Continuous charge

Continuous charge rates depend on the capacity to be recharged after an occasional discharge, the time allowed for this discharge and the cell temperature.

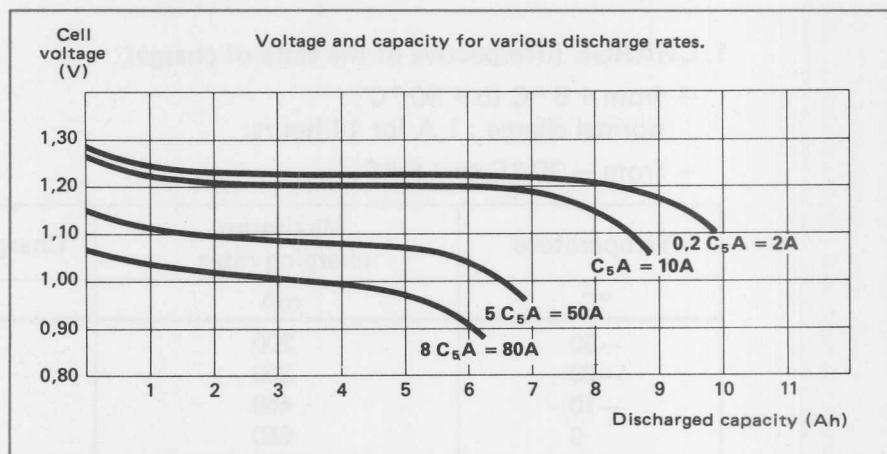
Recommended rates for a 24 hour recovery time between 0 °C and 30 °C.

Required capacity after 24 hours	Appropriate rates
Ah	mA
from 8 to 10	600
6 to 8	500
4 to 6	400
2 to 4	300
0,5 to 2	200
up to 0,5	100

### 3. DISCHARGE

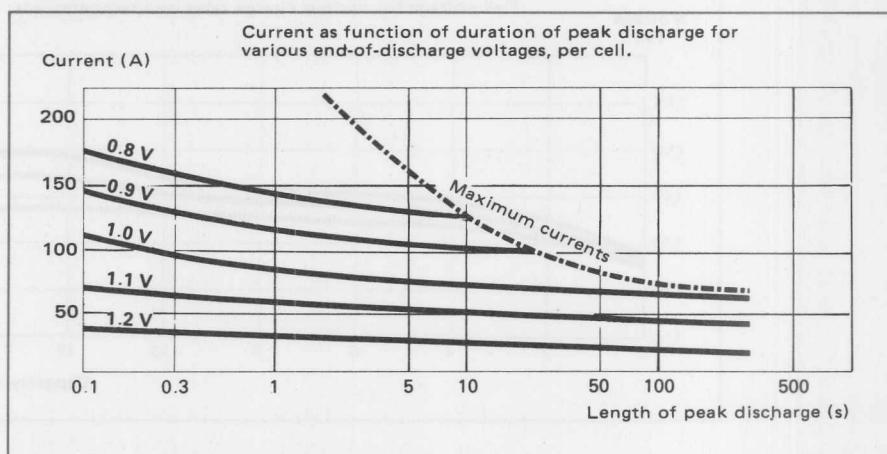
Continuous discharge at  $20 \pm 5^\circ\text{C}$ .

Maximum permissible continuous rate : 80 A.



Pulse discharge at  $20 \pm 5^\circ\text{C}$ .

Maximum power for a 0.3 s pulse : 130 W ( $U = 0.65\text{ V}$  -  $I = 200\text{ A}$ ).



#### NOTE :

These curves apply to SAFT battery packs which are fitted with heavy duty connections ensuring minimum voltage drop.

## 3 battery packs

### STANDARD BATTERY PACK ASSEMBLIES VR 10 SF

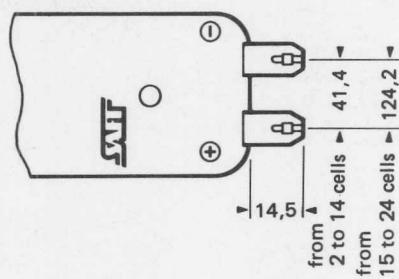
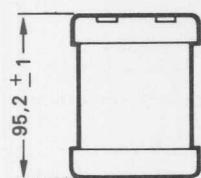
Rated capacity : 10 Ah

Nominal voltage : 2.4 to 28.8 volts.

#### DESCRIPTION

- Sleeved cells cemented side by side.
- Welded low resistance heavy duty connections.
- Top and bottom a.b.s. flanges, with fixing holes 8.5 mm dia.
- Outgoing solder tags (3 mm<sup>2</sup> wire).

### OVERALL DIMENSIONS (in mm)



	Nb élts	U volts	Réf.	L ± 1	K ± 1	A ± 0,25	B ± 0,25	*P (g)
	2	2.4	120 391	87.8	46			830
	3	3.6	120 392	87.8	87.8			1320
	4	4.8	120 220	87.8	87.8			1661
	5	6	120 221	129.2	87.8	41.4		2145
	6	7.2	120 222	129.2	87.8	41.4		2486
	7	8.4	120 393	170.6	87.8	82.8		2970
	8	9.6	120 394	170.6	87.8	82.8		3333
	9	10.8	120 395	212	87.8	124.2		3806
	10	12	120 223	212	87.8	124.2		4147
	11	13.2	120 396	253.4	87.8	165.6		4631
	12	14.4	120 397	253.4	87.8	165.6		4950
	13	15.6	120 398	294.8	87.8	207		5461
	14	16.8	120 399	294.8	87.8	207		5808
	15	18	120 400	170.6	170.6	82.8	82.8	6231
	16	19.2	120 401	170.6	170.6	82.8	82.8	6633
	18	21.6	120 403	212	170.6	124.2	82.8	7491
	20	24	120 224	212	170.6	124.2	82.8	8294
	24	28.8	120 408	253.4	170.6	165.6	82.8	9955

Maximum  
charge rate  
600 mA

\* W (g) : max. weight in grams.





Information given in this document, being subject to change without notice, does not commit SAFT until confirmed.

**SAFT** STORAGE BATTERY DIVISION

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